Jurnal Komunikasi Ikatan Sarjana Komunikasi Indonesia, Vol. 7 (2), 2022, 255-271

J U R N A L

KOMUNIKASI

IKATAN SARJANA KOMUNIKASI INDONESIA

E-ISSN: 2503-0795
P-ISSN: 2548-8740

Accessibility Concerns on COVID-19 Information Websites for Persons with Disability

http://dx.doi.org/10.25008/jkiski.v7i2.677

Hanny Hafiar[1*], Syauqy Lukman[2], Putri Limilia[1]
Wahyu Caesarendra[3], Kholidil Amin[1]

[1]Universitas Padjadjaran
Jl. Ir. Sukarno Km 21, Hegarmanah – Sumedang 45363 - Indonesia
[2]Australian National University
Canberra ACT 2601 - Australia
[3]Universiti Brunei Darussalam
Jl. Tungku Link, Gadong BE 1410, Bandar Seri Begawan - Brunei Darussalam
[*]Corresponding author: hanny.hafiar@unpad.ac.id

Submitted: July 06, 2022, **Revised**: November 27, 2022, **Accepted**: December 01, 2022
Accredited by Kemristekdikti No. 28/E/KPT/2019

Abstract
Persons with disabilities are a vulnerable group when obtaining reliable information, particularly during the current Pandemic of COVID-19. This group needs accurate and dependable information related to the effort of prevention, treatment, and other information on the Pandemic. Each 34 provincial government of Indonesia has their own dedicated COVID-19 information websites providing such information to the public. This study attempt to find accessibility issues that would impact a person with disabilities on all 34 COVID-19 websites managed by each respective provincial government. This study uses aXe (https://www.deque.com), an online tool that measures the total accessibility issues, types of issues, and impacts on people with disabilities on a website. Most COVID-19 websites managed by the provincial government have shown many issues, indicating failure to comply with the web content accessibility guidelines. The biggest issue is insufficient color contrasts in elements and images and the absence of illustrative text, which are very important for a person with visual impairment. We also find that level of accessibility is not correlated with the number of visitors.
Keywords: accessibility; people with disabilities; Covid-19; government websites; evaluation tools

Introduction

The current COVID-19 Pandemic demands continuous updates and information on the prevention and treatment of the disease. Communication technology advancement allows the mass distribution of COVID-19 information using various online media. People would access digital media more frequently to seek online health information (Zhao et al., 2020), including information related to COVID-19.

As people limit face-to-face communication, mediated communication—particularly using the online platform, is preferable.

Digital media is the most important platform in response to the growing demand for health information in the current pandemic era (Budd et al., 2020), with the World Wide Web as the backbone of information channels (Ismail et al., 2018). Government institutions worldwide use digital media to provide online information related to COVID-19 to their

citizen. Noting the importance of online media, the government of The Republic of Indonesia utilizes official provincial websites to spread COVID-19 information.

Each provincial government manages their own dedicated COVID-19 website, providing information for their respective area of concern. The existence of these official COVID-19 websites is expected to fill the needs of the public for reliable information, acknowledging the growing concern for widespread hoaxes and false news on the virus and the Pandemic (Susilo et al., 2021) causing information anxiety in the community.

There are 34 provinces in Indonesia, so each government manages 34 official COVID-19 websites. The content of the websites provides information on ongoing cases and statistics, the spread of cases, a map with information on infection potential, treatment instructions, referral hospital, bed availability in hospital, vaccine information, call center and hotline, and other information. The content of the website also provides information on treatment instructions, technical guidance, and news update excerpts, providing updated information on new cases. Table 1 displays the list of 34 provincial websites on COVID-19, with additional information on the number population of the province and the number of daily visitors to the websites.

Table 1. COVID-19 information website managed by each provincial government in Indonesia

No	Province	Population	Website	Visitor (Daily)
1	Aceh Nangroe Darusalam	5,274,871	http://covid19.acehprov.go.id/	6574
2	North Sumatera	14,799,361	http://covid19.sumutprov.go.id/	5420
3	Riau	6,394,087	http://corona.riau.go.id/	9979
4	Riau Islands	2,064,564	http://corona.kepriprov.go.id/	5260
5	Jambi	3,548,228	http://corona.jambiprov.go.id/	1651
6	West Sumatera	5,534,472	https://corona.sumbarprov.go.id/	7628
7	Bengkulu	2,010,670	http://covid19.bengkuluprov.go.id/	1581
8	South Sumatera	8,467,432	http://corona.sumselprov.go.id/	1976
9	Bangka Belitung Islands	1,455,678	http://covid19.babelprov.go.id/	3460
10	Lampung	9,007,848	https://covid19.lampungprov.go.id/	4468
11	DKI Jakarta	10,562,088	https://corona.jakarta.go.id/peta	41836
12	West Java	48,274,162	https://pikobar.jabarprov.go.id/	32735
13	Banten	11,904,562	http://infocorona.bantenprov.go.id/	6149
14	Central Java	46,516,035	https://corona.jatengprov.go.id/	25327
15	DI Yogyakarta	3,668,719	https://corona.jogjaprov.go.id/	9883
16	East Java	40,665,696	https://infocovid19.jatimprov.go.id/	26924
17	West Kalimantan	5,414,390	http://dinkes.kalbarprov.go.id/covid-19	3821
18	Central Kalimantan	2,669,969	https://corona.kalteng.go.id/	2250
19	East Kalimantan	3,766,039	https://covid19.kaltimprov.go.id/	6279
20	North Kalimantan	701,814	https://coronainfo.kaltaraprov.go.id/	1535
21	South Kalimantan	4,073,584	http://http//corona.kalselprov.go.id	2480
22	Bali	4,317,404	https://infocorona.baliprov.go.id/	5369
23	West Nusa Tenggara	5,320,092	http://corona.ntbprov.go.id/	6032
24	East Nusa Tenggara	5,325,566	http://covid19.nttprov.go.id/	1402
25	South Sulawesi	9,073,509	http://covid19.sulselprov.go.id/	5447
26	West Sulawesi	1,419,229	http://covid19.sulbarprov.go.id/	789
27	Central Sulawesi Tengah	2,624,875	http://dinkes.sultengprov.go.id/	2645
28	Gorontalo	1,171,681	http://dinkes.gorontaloprov.go.id/covid-19	3084
29	South Eastern Sulawesi	2,621,923	http://corona.sultraprov.go.id/	858
30	North Sulawesi	2,621,923	http://corona.sulutprov.go.id/	1548
31	Maluku	1,848,923	https://corona.malukuprov.go.id/	954
32	North Maluku	1,282,937	http://corona.malutprov.go.id/	224
33	West Papua	1,134,068	http://dinkes.papuabaratprov.go.id/	447
34	Papua	4,303,707	https://covid19.papua.go.id/	3549

Source: www.bps.go.id and www.statshow.com accessed on 13 June 2021

Supposing the population would regularly need updated information on COVID-19, we can assume there is a gap between the numbers of visitors with the numbers of the population, indicating poor attention by the community towards these official websites. Several factors

would cause low visits to a website, one, in particular, is accessibility issues; websites with accessibility problems deter visitors from coming (Velásquez et al., 2004). Accessibility is a critical aspect that needs attention from web developers and web managers to improve the quality of the website.

Accessibility to information is often associated with the interest of the person with disabilities, particularly for a person with visual impairment. We need to take note that the concept of providing accessibility of health information is not exclusively intended to cater to the needs of persons with disabilities but also the general public, including elderly people with limited abilities in accessing online media (M. Arief et al., 2020).

This study aims to find out issues related to the accessibility of provincial COVID-19 websites, as these websites play a very important role in the current Pandemic in providing information. Accessibility concerns would be critical, as it dictates user experience when accessing the websites. Currently, Indonesians are experiencing information anxiety due to the growing cases of COVID-19, and this could lead to them being uninformed or, worse, trapped with misinformation (Nasir et al., 2020), particularly with misinformation found on social media, such as false news on Twitter (Rodríguez et al., 2020), hoaxes on WhatsApp (Dida et al., 2021), and false news on Facebook (Preston et al., 2021).

The Pandemic stimulates COVID-19 research bloom, including studies on information and media. There are studies related to bibliometric on COVID-19 (Dehghanbanadaki et al., 2020), studies on the person with disabilities experience during the current Pandemic (Epstein et al., 2021), including studies on government websites accessibilities, studied in several regional contexts, such as in Indonesia (Darmaputra et al., 2017), Saudi Arabia (Akram & Sulaiman, 2017), Latin America (Acosta et al., 2018), and Dubai (Al Mourad & Kamoun, 2013). There is also similar research that studied the accessibility of the WHO website (Fernández-Díaz et al., 2020), but so far, we have found no research that responded to the needs of persons with disabilities by studying the accessibility of government websites that provide information on COVID-19, especially in countries with a relatively high case rate such as Indonesia.

We believe the results of this research would serve as references for increasing the accessibility of information related to COVID-19 provided by the government through their websites. It would play an important role in improving the government's effort to increase the community's awareness of the Pandemic. Improvement in accessibility to information media related to COVID-19 provided by the government is expected to help to reduce information anxiety and the public getting trapped in misleading information and hoaxes.

Theoretical Framework

Disabilities and the COVID-19 Pandemic

The person with disabilities (PWD) are more vulnerable during the Pandemic (Sakellariou et al., 2020); for example, research on Intellectual Disabilities in the United States (Gleason et al., 2021), even prior to the COVID-19 Pandemic PWD has increased risk and difficulties when accessing healthcare services and performing daily instrumental activities (Bernard et al., 2020). The effects of COVID-19 on PWD would include an increased risk of contracting diseases, reduced access to health care, and social barriers that hinder efforts to mitigate the Pandemic (Shakespeare et al., 2021).

During a pandemic, the greatest challenge experienced by PWD is related to health care which places them at greater risk (Sabatello et al., 2020). Such high risk makes PWD have a fairly high level of psychological concerns related to the COVID-19 Pandemic (Rotas & Cahapay, 2021).

Acknowledging the danger of the virus amidst the era of information uncertainties prompts people to actively seek out information on COVID-19 (Soroya et al., 2021). It includes PWD, particularly people with visual impairments, as they are more challenged when accessing visual information which can be trusted (Bernard et al., 2021). Considering PWD are more vulnerable during the COVID-19 Pandemic, the interest in providing reliable and trusted information is urgent.

Seeking Information on COVID-19 and How Information Circulates

PWD is a group of people at higher risk during the COVID-19 Pandemic, and people with higher medical risk tend to be more proactive in seeking information related to the disease (Dobransky & Hargittai, 2021). Searching for health information online is a common way used by health consumers to become more informed and to improve their health literacy (Zimmerman & Shaw jr, 2019). Information from various websites reinforces individual beliefs (Indriani & Prasanti, 2020).

In the context of risk, seeking and processing information are driven by the motivation to reduce uncertainty (Kim et al., 2020).

During the Pandemic, a tsunami of information related to COVID-19 occurred in the community (Azari & Setianto, 2021). The flood of information related to COVID-19 is a natural response from information sources to meet the needs of information consumers who are actively searching for information through online media. Unsurprisingly, the search trend for the keywords 'mask', 'hand sanitizer,' 'social distancing,' and 'COVID-19' is increasing during this era (Lim et al., 2020). Likewise, keywords search for 'Corona' and 'Coronavirus.' (Limilia & Pratamawaty, 2020).

During the Pandemic, the internet is used by the public as an important source of health information (Zhao et al., 2020). People also use social media to increase their knowledge about diseases (Islam et al., 2021; Prihantoro et al., 2022). Unfortunately, rumors and misinformation about COVID-19 and the vaccine are heavily circulated on social media (Islam et al., 2021).

The role of the government in tackling hoaxes and misinformation by providing reliable information is critical for society (Susilo et al., 2021), avoiding public confusion and fear. Considering the high need for information related to COVID-19, the government should become a credible source of information and provide accessible information media for the public, including PWD. WHO has offered a guideline for governments on handling the dissemination of information on COVID-19, including paying more attention to PWD to ensure public inclusion of PWD when accessing health information during the Pandemic (Houtrow et al., 2020).

Website accessibility

Accessibility in this study refers to the extent to of a product, device, service, or environment is available and can be navigated by people with special needs. As we know, web technology makes it easier for users to share information with their social networks without meeting face to face and adding new social networks with the same interests (Puspitasari & Irwansyah, 2022). Access to software and hardware technology products can be referred to as digital accessibility, so website accessibility is at the core of digital accessibility (Kulkarni, 2019). Therefore, the website must be accessible to people, including persons with disabilities (Ismail et al., 2018).

Unfortunately, some website designers and developers, particularly in government agencies, have failed to follow the website accessibility criteria (Acosta et al., 2018). In principle, information on a website must be accessible. However, there are times when the website developer cannot fully meet the accessibility standards (Hafiar et al., 2022), making it difficult for persons with disabilities to utilize it (Sumartias et al., 2022). It is concerning as the accessibility of government-managed websites allows people with disabilities to improve their everyday well-being, improving society's quality of life as a whole (Akgul & Vatansever, 2016), particularly related to healthcare and the prevention of diseases.

The government attempts to improve the service quality to the public by accommodating e-service (Al Mourad & Kamoun, 2013). Making information on COVID-19 available to the public is an important service for the public, with the hope of inclusivity for every group of people. Unmet needs for e-Government accessibility can be considered a violation of human rights. We need to eliminate this gap, allowing PWD and elderly people to access e-Government services offered online (Acosta et al., 2018), which includes information on COVID-19. Given the high demand for information about COVID-19, it is paramount for the government to provide information using every media accessible to the public, including for PWD.

Material and Methodology

This study employs a quantitative approach to answer several research questions; (1) to find out the number of issues related to accessibility on provincial COVID-19 websites, (2) to find out the number and types of accessibility issues of the websites, (3) to find out the number and type of accessibility issues impacting persons with disabilities of the websites, (4) to measure the correlation between accessibility issues and the total number of website visitors.

As a reference for evaluating the 34 websites, his study uses the Web Content Accessibility Guidelines (WCAG) 2.0. The guidelines, introduced in 2008 by Web Accessibility Initiative, revised several standards for checking web accessibility used by the former WCAG 1.0 (Li et al., 2012). There are four general principles of accessibility in WCAG 2.0 which includes:

perceivable, operable, understandability, and robustness. These four principles must have complied with; otherwise, users with disabilities will not be able to properly use the Web (Rømen & Svanæs, 2012).

Aside from WCAG 2.0 as guidelines for evaluating websites, this study uses aXe from Deque, a tool specifically designed to evaluate websites based on several metrics with compliance to WCAG 2.0 concerning WAI-ARIA 1.0 (Web Accessibility Initiative Accessible Rich Internet Applications) that is for assistive technology such as the availability of screen reader (M. Arief et al., 2020). The aXe is relatively easy to use and is available for free/unpaid. (Taylor, 2019). Using free/unpaid evaluation tools is very easy and is recommended for web managers/developers to improve the quality of web accessibility of their respective websites. When using aXe, users only need to download the app as a browser add-on, navigate to the web page to be evaluated, and automatically learn the web accessibility errors using the tools.

As the total number of websites for the study is relatively small, 34, respective to the number of provinces in Indonesia, we decided to consider all websites. Interestingly, each province tried to come up with their own unique domain names, using words related to COVID-19 such as 'corona,' 'infocorona,' 'coronainfo,' 'covid19', and 'infocovid19'. All websites use the formal domain address of go.id, representing the formal identity of the website managed by the government. The research stages for this study is divided into four stages; (1) cataloging the URL of the official website for COVID-19 information managed by each provincial government; (2) checking the accessibility of websites using the aXe evaluation tool; (3) inputting data in excel. The data inputted are the number of total accessibility impact issues and also types of impacts which are categorized as: need review, critical, serious, moderate, and minor, followed by checking data on critical error issues impacting persons with disabilities. The numerical data would be used for descriptive data analysis; (4) perform statistical analysis using the Spearman-rho statistics to determine the correlation between the total issues and the number of daily visitors on each website. Figure 1 shows the stages of research of this particular study.

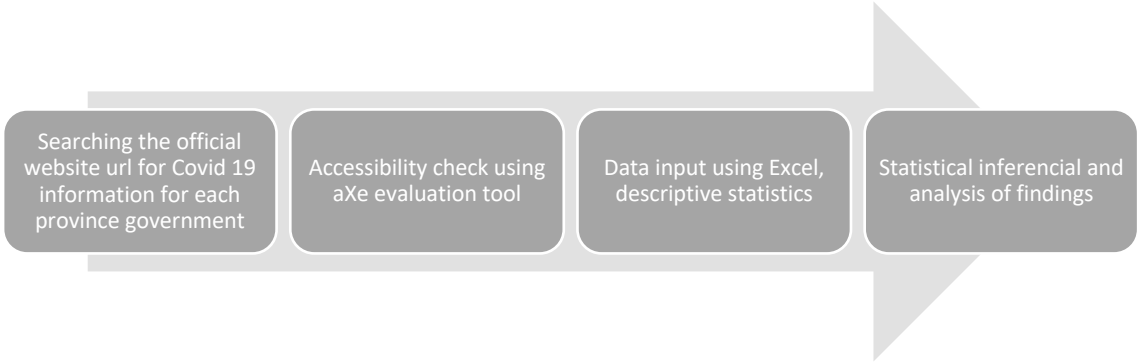

Figure 1. Research Stages

Result and Discussion

Result

A website is an important communication medium for organizations to disseminate information to the public. It also applies to the government disseminating public service information, including information related to COVID-19. During the Pandemic, the government must disseminate information about COVID-19 to society, including persons with disabilities. Hence the government needs to provide an accessible website easily accessed by persons with disabilities and elderly people (Leist & Smith, 2014).

Table 2 provides an impact analysis on how severe the accessibility issues would impact user experience. The result of the analysis on how accessibility issues of COVID-19 websites would impact users showed that most accessibility issues have a 'serious' impact at 39%, and only 2% of the websites have 'minor' impact issues. The largest range of accessibility impact is in the 'moderate category, with 2-352 issues per website, and the smallest range is in the 'minor' impact category, with 0-32 issues per website. Most websites have a 'serious' accessibility impact.

Table 2. The results of accessibility impact evaluation of the COVID-19 information website managed by every provincial government in Indonesia using the 'aXe' evaluation tool

Types of accessibility impact	Number of accessibility issues*	Average Accessibility issues per website*	% of issues per website *	Number of websites with accessibility impact in the category	Range of Accessibility issues *
Need review	1407	42.63636	27%	34	2-219
Critical	434	13.15152	8%	29	0-146
Serious	1975	59.84848	39%	34	2-331
Moderate	1215	36.81818	24%	34	2-353
Minor	93	2.818182	2%	25	0-32
Total Issues	5124	155.2727	100%	34	20-785

*based on types of accessibility impact in the category
Date of web evaluation access: June-July 2021

From all 34 websites, only five were identified without any 'critical' impact, and nine were identified with no 'minor' impact. Accessibility impact in this analysis categorizes the impact of accessibility issues as 'critical,' 'serious,' 'moderate,' and 'minor' (Sims, 2016b). The critical impact is an absolute barrier to accessing the website for any user. The serious impact is an accessibility error that can create significant barriers for persons with disabilities to use the web (Sims, 2016a).

Another finding related to 'need review.' Having noted the 'Need review,' the provincial government should immediately improve their website as the average score on the issue is notably high. The results of the 'need review' category need to be complemented with direct evaluations from web experts, as evaluating web accessibility should not rely solely on tools (Ismail & Kuppusamy, 2019). It is important to allow the widespread information related to COVID-19 to be accepted by all levels of society, including those with disabilities, as an effort to create inclusive knowledge. In the end, improving collective knowledge can help speed up the handling of COVID-19 cases in each region that continues to increase in Indonesia.

Examination of the types of issues is important to identify repeated mistakes made by developers. Suppose the number of repetitions of errors is quite frequent. In that case, we could assume that the developer does not know the error and how to fix it or, worse, they are not concerned with such an issue, allowing intentional or unintentional neglect. Findings regarding the issues found in the evaluation results are presented in table 3.

There are 45 issues detected, with four issues mostly found: 'visual elements must have sufficient color contrast; 'all page content should be contained by landmarks; 'links must have discernible text,' and 'images must have alternate text' explaining the image. The study's results also found several other issues that made the COVID-19 website have accessibility issues. 'Elements must have sufficient color contrast is the type of error that occurs in every website, with a total of 2,446 errors, with each website having an average of 71.94 errors for this type.

This finding is in line with previous research, which also found that color contrast is a problem that often appears on campus websites (Ismail & Kuppusamy, 2019). The color contrast indicator describes the accessibility of a website from the perspective of color contrast on visual elements of a website. A website is categorized as accessible if the web page uses colors with high contrast that would make it very easy for the person with disabilities—especially a person with color blindness or low vision, to distinguish the differences between borders, outlines, details, edges, and text, which in turn makes it easier for them to read the content of the web.

Table 3. Most common issues of accessibility on provincial government-managed COVID-19 websites in Indonesia

No	Types of Accessibility issues	Total	Mean	Number of websites*	%
1	Elements must have the sufficient color contrast	2446	71,94	34	100

2	All page content should be contained by landmarks	1005	29,56	31	91
3	Links must have discernible text	310	9,12	28	82
4	Images must have alternate text	294	8,65	22	65
5	elements must be contained in a or	220	6,47	6	18
6	Buttons must have discernible text	107	3,15	13	38
7	Heading levels should only increase by one	103	3,03	28	82
8	Frames must have an accessible name	61	1,79	16	47
9	Frames should be tested with axe-core	61	1,79	13	38
10	id attribute value must be unique	58	1,71	14	41
11	ARIA commands must have an accessible name	56	1,65	4	12
12	Links with the same name have a similar purpose	54	1,59	24	71
13	The document should have one main landmark	40	1,18	25	74
14	ARIA's role should be appropriate for the element	34	1,00	9	26
15	Elements must only use allowed ARIA attributes	33	0,97	13	38
16	The page should contain a level-one heading	27	0,79	19	56
17	<video> elements must have captions	26	0,76	9	26
18	Ensure interactive controls are not nested	22	0,65	4	12
19	Ensure that the scrollable region has keyboard access	22	0,65	7	21
20	Inline text spacing must be adjustable with custom stylesheets	18	0,53	2	6
21	Frames should have a unique title attribute	17	0,50	5	15
22	Certain ARIA roles must be contained by particular parents	14	0,41	5	15
23	Ensures landmarks are unique	14	0,41	13	38
24	Table header text must not be empty1	13	0,38	2	6
25	Alternative text of images should not be repeated as text	9	0,26	1	3
26	Elements of role none or presentation should be flagged	8	0,24	3	9
27	Certain ARIA roles must contain particular children	7	0,21	6	18
28	<marquee> elements are deprecated and must not be used	6	0,18	6	18
29	Headings should not be empty	5	0,15	4	12
30	IDs used in ARIA and labels must be unique	5	0,15	3	9
31	All the elements and elements with role=columnheader/ row header must have data cells they describe	4	0,12	2	6
32	IDs of active elements must be unique	4	0,12	3	9
33	ARIA attributes must conform to valid values	3	0,09	2	6
34	Use aria-role description on elements with a semantic role1	3	0,09	2	6
35	<html> element must have a lang attribute	2	0,06	2	6
36	and must only directly contain , <script> or <template> elements	2	0,06	2	6
37	Form elements must have labels	2	0,06	2	6
38	Zooming and scaling should not be disabled	2	0,06	2	6
39	[role='img'] elements have an alternative text	1	0,03	1	3
40	ARIA input fields must have an accessible name	1	0,03	2	6
41	ARIA roles used must conform to valid values	1	0,03	1	3
42	Aside should not be contained in another landmark	1	0,03	1	3
43	The document should not have more than one banner landmark	1	0,03	1	3
44	Elements should not have tabindex greater than zero	1	0,03	1	3
45	Form elements should have a visible label	1	0,03	1	3

*number of websites with this type of accessibility issues
Date of web evaluation access: 19 June 2021

Users who suffer from color blindness could have problems differentiating interactive buttons when the color contrast ratio is not enough between background and foreground color (Calvo et al., 2016). WCAG 2.0 defines a specific threshold of 4.5:1 and 7:1 to help ensure testability (Abou-Zahra & Brewer, 2019). Developers need to understand and comply with this guideline.

Based on the study results, it seems that government website developers do not really prioritize the concept of contrast. Ideally, developers should have a basic understanding of the principles of contrast. When designing a

website, the foreground and background colors should not have the same tone of color. To add more problems, web developers often have conflicting choices of colors in designing with the client (provincial government). Typically, the color selection must match the colors on the logo or the color identity of the organization. To deal with this issue of color contrast, government representatives should discuss with web developers the choice of colors with consideration to the interest of the person with a disability.

'Images must have an alternate text' is the fourth issue that often appears on the COVID-19 websites managed by the provincial government (294). This finding is in line with the literature, which also found similar problems as a common problem in website accessibility (Ismail & Kuppusamy, 2019). This issue suggests that each image should have an alternative text description that can help explain the image's content to help blind people understand the content of the image. Suppose an image does not have an alternative text explanation. In that case, blind people cannot understand the visual information presented on the website, making COVID-19 information not conveyed properly to the person with disabilities. It is also very important to design government websites by implementing accessibility following the web accessibility guidelines (Akram & Sulaiman, 2017).

We need to note that addressing the issue of the alternate text that explains visual images may be challenging for web developers, as providing images with alternate text requires a special strategy as web developers are requested to not only formulate the text details but also translate them into HTML. Web developers must master the right description strategy, providing effective and efficient text that explains the visual image properly without writing wordy text. The following table displays how accessibility errors would impact persons with disabilities based on the type of disability.

All types of issues in table 3 will have an impact on particular types of user disabilities. Table 4 shows that those who experience the most challenge due to the 45 issues in table 3 are users with blindness. Of the 45 issues, there are 39 issues that will affect users with blindness, 35 on users with deaf-blindness, and 28 on users with mobility disabilities.

Table 4. The number of accessibility issues impacts the type of disability

Disabilities Affected	Number of affecting accessibility issues
Blind	39
Deafblind	35
Low Vision	10
Colour-blindness	3
Mobility	28
Deaf	2
Cognitive	2
Attention	1

Date of web evaluation access: 19 June 2022

As past studies have argued that websites with accessibility problems would deter visitors from coming (Velásquez et al., 2004), we try to find evidence of the correlation between total issues and the number of visitors, with results shown in table 5. Considering that critical impact is an absolute barrier, we also try to present the correlation between the number of Critical impacts and the number of visitors in table 6.

Table 5 shows the calculations of spearman rho statistics on whether the number of total issues of each 34 websites included in this study is correlated with the number of visitors. There was no evidence of the correlation between the number of total issues and the number of visitors as the test was not statistically significant, $r_s = 0.088$, $p = 0.62$. This result shows that for internet users in Indonesia, accessibility is not correlated with the number of visitors, as accessibility issues for persons with disabilities are not detrimental to people visiting the websites.

Table 6 shows the calculations of spearman rho statistics on whether the number of critical issues of each 34 websites is correlated with the number of visitors. There was no evidence of the correlation between the number of critical issues and the number of visitors as the test was not statistically significant, $r_s = -0.047$, $p = 0.78$. Similar to the previous result, there was no evidence of the correlation between critical accessibility issues with the number of visitors.

Table 5. Spearman correlations statistical test between the total issues of each website and the number of visitors

Variable	Number of samples	Spearman Rho	Test of Ho: sum of total issues and number of visitors are independent		Conclusion
Number of Total issues and Number of Visitors	34	0.088	Prob > |t| =	0.62	No correlations between the number of total issues and the number of visitors

Table 6. Spearman correlations statistical test between the number of critical issues of each website and the number of visitors

Variable	Number of samples	Spearman Rho	Test of Ho: sum of total issues and number of visitors are independent		Conclusion
Number of critical issues and Number of Visitors	34	-0.047	Prob > |t| =	0.78	No correlations between the number of critical issues and the number of visitors

As the correlation results showed no evidence of the association between accessibility issues and the number of visitors, we believe this is because the need for information on COVID-19 amid the Pandemic remains high, prompting users to continuously access the website, despite the accessibility issues. In addition, the correlation absence can also be caused by the characteristics of visitors are mostly general public—sans disability; in other words, this study was not able to distinguish between visitors with disabilities and those without, as accessibility mostly affects visitors with disabilities. Therefore, future research needs to directly measure the level of website accessibility issues using a specific sample of visitors with disabilities.

Discussion

The results of the study show that websites related to COVID-19 managed by the provincial government in Indonesia still have accessibility issues. These results are similar to other studies in different settings and research contexts. Issues of accessibility for websites owned by institutions in Indonesia occur in: the websites of provincial governments in Indonesia (Darmaputra et al., 2017), higher education (Arasid et al., 2018), and also occurs on websites managed by ministries and higher government institutions (Masyhur, 2015). Based on the literature, we can conclude that website accessibility has not become a top priority for institutions in Indonesia, particularly government agencies.

However, the issue of accessibility on government websites also occurs in other countries and regions. Web accessibility results of government websites in several countries tend to show that they have not complied with the minimum level of website accessibility requirements, such as a study in Turkey (Akgul & Vatansever, 2016), Kingdom of Saudi Arabia (Akram & Sulaiman, 2017), Jordan (Al-Bataineh & Mustafa, 2016), India (Ismail et al., 2018), United Arab Emirates (Kamoun & Almourad, 2014), Malaysia (Latif & Masrek, 2010), Northern and Southern Cyprus (Ilhan et al., 2020). Relatively similar results were also produced by research in several countries in Latin America (Acosta et al., 2018), countries in Europe (Leist & Smith, 2014), and other countries of UN members (Goodwin et al., 2011). It means that website accessibility is still a global issue that every institution and every country must address.

This study found that the most detected website accessibility issues were problems with visuals not having sufficient color contrast. Other research in several countries and other sectors found that most issues most of the problems lay in the unavailability of text equivalents for non-text elements (Akgul & Vatansever, 2016), use of deprecated HTML (Goodwin et al., 2011), issues on info and relationships, such as page title, labels, link purpose, parsing, etc. (Arasid et al., 2018). We can conclude that the most common accessibility issues on every website in each sector and region may vary. The following figures 2 and 3 provide an example of some accessibility issues typically found on COVID-19 websites managed by the provincial government in Indonesia.

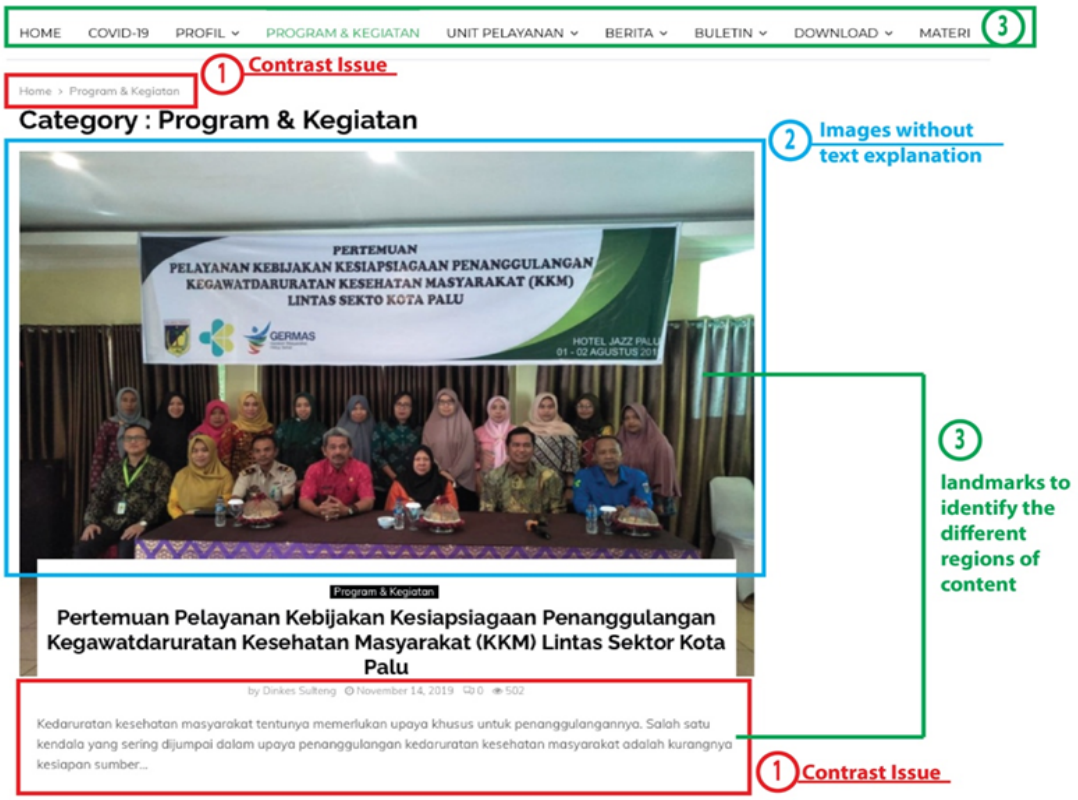

Figure 2. Recommendations for accessibility improvements on COIVD-19 website managed by one of the provincial governments

In Figure 2, we can see some important text elements are not very discernible visually as they have contrast issues (1). It would be very difficult for people with deafblind to distinguish and for text-to-speech applications to detect, rendering text-to-speech impossible for blind people. The pictures/images should also have been explained by text (2), allowing blind people to recognize the content of a picture/image. Typically, a simple text caption that provides a brief explanation of the picture/image, like the captions found in news photos in a newspaper, would be sufficient. Different regions of the web should also be contained in different 'landmarks' that distinguish different contents (3). In the figure, it is quite difficult to distinguish the area of important links on the top part ("Home," "COVID-19", "PROFIL," etc.) as the links are not contained in landmarks. The image and text at the bottom are also not contained in different landmarks. Aesthetically and functionally, the current web design would not pose any problem for normal people, but accessibility issues are critical for people with disabilities.

In Figure 3 below, we can see another example of accessibility issues, with no text caption explaining the image and tables displayed as an image rather than in text format. Not displaying tables in text format would make text-to-speech difficult, as people with visual impairments would need optical character recognition (OCR) to detect the text. It would be very difficult to interpret the image as the OCR application must detect the text first, followed by a text-to-speech application. The table itself has a contrast problem with the background cluttering it, which would also make the OCR process difficult.

The lack of awareness and understanding from government website developers regarding website accessibility, as found in Figures 2 and 3, is one of the factors causing the low level of compliance for website development, according to WCAG 2.0. The finding reinforces that 64.7% of website developers have not attended training related to accessibility (Latif & Masrek, 2010). When developers acknowledged the importance of website accessibility, they tend to test web accessibility using automated test tools, skipping the actual testing phase for users with disabilities (Król & Zdonek, 2020). Increasing awareness of developers, especially developers of government-managed technology facilities, is crucial. Neglecting the need for accessibility would make the public believe the government

is ignorant of the special needs of the person with disabilities.

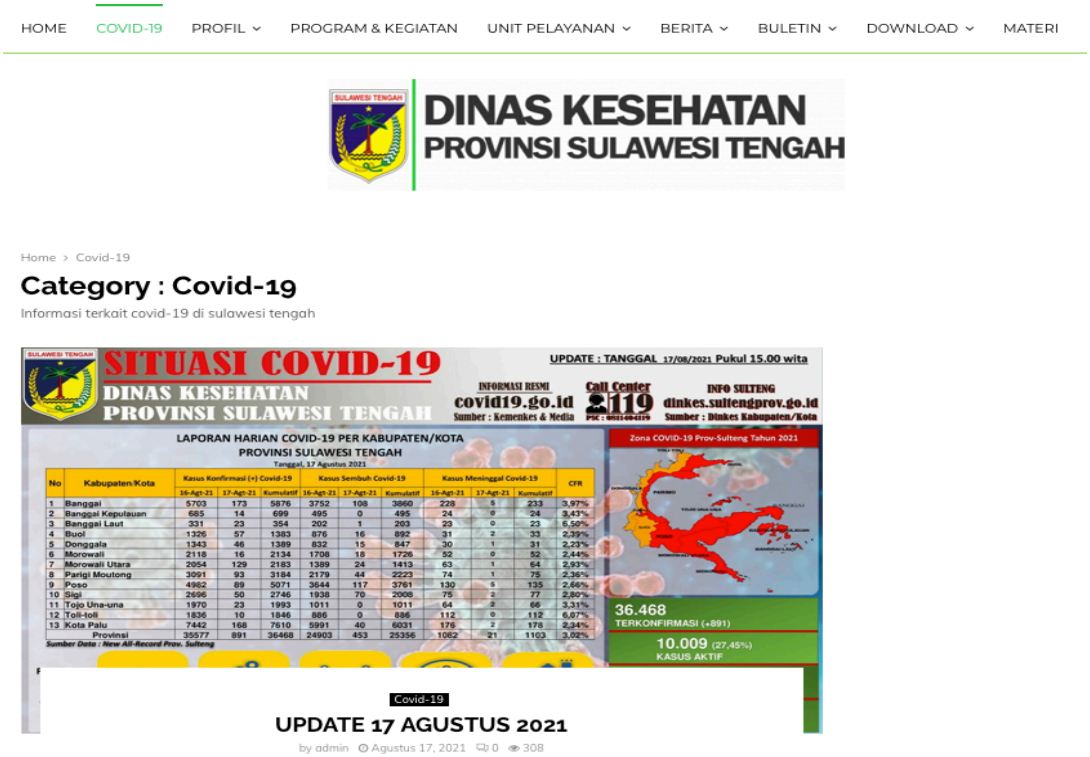

Figure 3. OCR issue: table displayed as picture

On the other hand, it is also necessary for the person with disabilities to take a proactive stance both individually and institutionally, voicing rights and interests by giving feedback on services provided by the government. For example, providing direct critiques when experiencing accessibility issues on government websites. PWD needs to take proactive action in criticizing the accessibility of government websites, especially in this pandemic era. Not complying with the accessibility guidelines would deter persons with disability from accessing the websites. We fear that persons with disabilities will seek other sources of information that may be misleading and unreliable. The public's entrapment in false news, misinformation, and hoaxes will be counterproductive to the government's efforts to deal with the Pandemic.

The COVID-19 Pandemic has made Indonesians more empathetic toward each other (N. N. Arief & Pangestu, 2021). One way to express empathy is the form of real action. The community can also act as an agent of change by participating in advocating the interests of persons with disabilities to the stakeholders. If we refer to the disability paradigm that adheres to a social model, the community must change to adjust to PWD, not demanding PWD to adjust with the community (Samaha, 2007). The COVID-19 Pandemic cannot be prevented only by maintaining personal health but must also be accompanied by efforts to maintain other people's health in the surrounding environment. It is very important to disseminate and consume accurate and reliable health information related to COVID-19 as part of the effort for the community to have a common understanding of the disease and is willing to participate in handling it together.

The obligation to provide accurate and reliable health information related to COVID-19 and to provide it using accessible communication media is not solely the responsibility of a government in a single country but the responsibility of everyone in various parts of the world. Since there is not a single country that is not affected by this global Pandemic, governments in various countries should acknowledge and supervise the accessibility of the communication media they manage, especially government communication media outlets related to COVID-19 information, for the sake of citizen's health, welfare, and more importantly, lives.

We acknowledge several limitations in this study, as the government websites related to COVID-19 evaluated are limited to government websites at the provincial level. Several websites related to COVID-19, managed by the central government and the private sector, are still not included in the study. However, the purpose of selecting websites managed by the provincial government aligns with the opinion that giving the regional mandate to the local government in managing COVID-19 at the provincial or district/city levels would accelerate the response from the community (Djalante et al., 2020). Another limitation of his study is using only one evaluation tool, 'aXe,' an automated accessibility evaluation tool from Deque, and only one guideline, WCAG 2.0, as a reference. There are several automated accessibility evaluation tools and other accessibility guidelines that can be used in further research, allowing more comprehensive results by comparing findings from two or more tools and guidelines.

Based on the results of the accessibility evaluation, we provide several recommendations targeted to the government groups of persons with disabilities and society. Referring to the total issues on each COVID-19 information website managed by the government in each province, we suggest that the government immediately establish and supervise government-owned websites to allow inclusions toward persons with disabilities. Establishing proper policy on website accessibility is important, coupled with enforcement procedures, such as making the accessibility compliance of government websites a mandatory requirement (Akgul & Vatansever, 2016).

The accessibility of government websites is an urgent matter, especially for websites related to COVID-19. An accessible government website can increase the credibility of government communication media as a source of information for the public in dealing with the Pandemic. By having good credibility, media platforms managed by would discourage the public from choosing other media, avoiding entrapment of misleading information and hoaxes, ultimately hindering the government's efforts to deal with the Pandemic.

The result of the study also supports the urgency for the government to accelerate a coordinated and coherent response effort in dealing with COVID-19 information, by including key government people and institutions in a particular ministry of health and ministry of communication and information (Djalante et al., 2020), the communication and information flow between the government. The community would be optimized for the society's resilience in handling COVID-19 in Indonesia.

The government can also optimize the role of social media, such as using Twitter to feature leadership figures during the COVID-19 Pandemic (Haman, 2020). A simple mistake of an improper tweet would create an uproar in society, distracting the focus from individual and group resilience against the Pandemic, or even worse, causing skepticism and apathy towards the Pandemic. However, social media content distributed by government officials should also consider communication ethics and risks by prioritizing credible, accurate, and trustworthy information delivered with empathy and respect (Wu & John, 2021), as well as avoiding the spread of personal opinions that can cause controversy in the community.

Persons with disabilities should also be more active in raising awareness of their rights and voicing their own interests by cooperating with communities and organizations to take advocacy steps. Organizations and communities with interests in persons with disabilities have a bigger responsibility to emphasize the awareness of government agencies in making government websites more accessible (Akgul & Vatansever, 2016). The public, specifically the web developer communities and communities related to information communication technology tools, should be more aware of the need for information accessibility for persons with disabilities about COVID-19. We also expect the public to be more sensitive and considerate of the ethics and communication manner in disseminating information during the COVID-19 Pandemic.

Conclusions

The study results generally show that most of the websites related to COVID-19 managed by provincial governments are the least accessible for people with disabilities. Most accessibility issues would 'seriously' impact users' experience, which requires improvements as soon as possible for the benefit of the community in obtaining information related to COVID-19. This finding is in line with previous studies which found similar results that found websites of institutions in Indonesia still experience accessibility problems.

Most accessibility issues are on visual elements' lack of color contrast: 'Elements must have sufficient color contrast. Other issues include: 'all page content should be contained by landmarks, 'links don't have discernible text,' and 'the absence of alternate text explaining visual images.' Those issues are important in helping people with blindness, low vision, and color blindness understand and distinguish the information provided on the website. Unfortunately, most government website developers are still not aware of this issue, as indicated by the relatively high serious impact number found. It is due to the lack of understanding from web developers regarding the importance of color contrast in web design and the urgency of having an alternative text explaining an image for visually impaired people.

The type of persons with disabilities affected the most by the accessibility issues are users with blindness, deaf-blindness, and mobility disabilities. This study also found no significant evidence of the relationship between the level of website accessibility or critical impact and the number of web visitors. We can conclude that people will continue to visit a website even though it is lacking in accessibility and people still need information related to COVID-19.

This study recommends the government take immediate action to make government websites more accessible by implementing policies on the issue, such as requiring the use of accessibility principles on every government website. Additionally, we also recommend the government immediately review their current respective websites' accessibility. It is important to improve the credibility of the government's communication media to be considered the primary source and medium of information for the public on the COVID-19 Pandemic. People with disabilities are also expected to actively voice their needs by collaborating with related institutions and organizations.

References

Abou-Zahra, S., & Brewer, J. (2019). Standards, Guidelines, and Trends. In Y. Yesilada & S. Harper (Eds.), *Web Accessibility. The Human-Computer Interaction Series* (pp. 629–649). https://doi.org/10.1007/978-1-4471-7440-0_32

Acosta, T., Acosta-Vargas, P., & Lujan-Mora, S. (2018). Accessibility of eGovernment Services in Latin America. *5th International Conference on EDemocracy and EGovernment, ICEDEG 2018*. https://doi.org/10.1109/ICEDEG.2018.8372332

Akgul, Y., & Vatansever, K. (2016). Web Accessibility Evaluation of Government Websites for People with Disabilities in Turkey. *Journal of Advanced Management Science*, *4*(3), 201–210. https://doi.org/10.12720/joams.4.3.201-210

Akram, M., & Sulaiman, R. B. (2017). A Systematic Literature Review to Determine the Web Accessibility Issues in Saudi Arabian University and Government Websites for Disable People. *International Journal of Advanced Computer Science and Applications*, *8*(6), 321–329. https://doi.org/10.14569/ijacsa.2017.080642

Al-Bataineh, A. F., & Mustafa, S. H. (2016). How Jordanian e-Government websites respond to the needs of people with disabilities. *Proceedings - CSIT 2016: 2016 7th International Conference on Computer Science and Information Technology*, 1–6. https://doi.org/10.1109/CSIT.2016.7549447

Al Mourad, M. B., & Kamoun, F. (2013). Accessibility Evaluation of Dubai e-Government Websites: Findings and Implications. *Journal of E-Government Studies and Best Practices*, *2013*, 1–15. https://doi.org/10.5171/2013.978647

Arasid, W., Abdullah, A. G., Wahyudin, D., Abdullah, C. U., Widiaty, I., Zakaria, D., Amelia, N., & Juhana, A. (2018). An Analysis of Website Accessibility in Higher Education in Indonesia Based on WCAG 2.0 Guidelines. *IOP Conference Series: Materials Science and Engineering*, *306*(012130). https://doi.org/10.1088/1757-899X/306/1/012130

Arief, M., Rissanen, S., & Saranto, K. (2020). Effectiveness of web accessibility policy implementation in online healthcare information. *Studies in Health Technology and Informatics*, *270*, 1108–1112. https://doi.org/10.3233/SHTI200334

Arief, N. N., & Pangestu, A. B. (2021). Perception and Sentiment Analysis on Empathic Brand Initiative During the COVID-19 Pandemic : Indonesia Perspective. *Journal of Creative Communications*, *10*, 1–17. https://doi.org/10.1177/09732586211031164

Azari, M. N., & Setianto, Y. P. (2021). Gender, Konsumsi Berita COVID-19 dan News Fatigue di Jakarta. *Jurnal Kajian Jurnalisme*, *5*(1), 1–14. https://doi.org/10.24198/jkj.v5i1.31587

Bernard, A., Weiss, S., Rahman, M., Ulin, S. S., D'Souza, C., Salgat, A., Panzer, K., Stein, J. D., Meade, M. A., McKee, M. M., & Ehrlich, J. R. (2021). The Impact of COVID-19 and Pandemic Mitigation Measures on Persons with Sensory Impairment. *American Journal of Ophthalmology*. https://doi.org/10.1016/j.ajo.2021.06.019

Bernard, A., Weiss, S., Stein, J. D., Ulin, S. S., D'Souza, C., Salgat, A., Panzer, K., Riddering, A., Edwards, P., Meade, M., McKee, M. M., & Ehrlich, J. R. (2020). Assessing the impact of COVID-19 on persons with disabilities: development of a novel survey. *International Journal of Public Health*, *65*(6), 755–757. https://doi.org/10.1007/s00038-020-01433-z

Budd, J., Miller, B. S., Manning, E. M., Lampos, V., Zhuang, M., Edelstein, M., Rees, G., Emery, V. C., Stevens, M. M., Keegan, N., Short, M. J., Pillay, D., Manley, E., Cox, I. J., Heymann, D., Johnson, A. M., & McKendry, R. A. (2020). Digital technologies in the public-health response to COVID-19. *Nature Medicine*, *26*(8), 1183–1192. https://doi.org/10.1038/s41591-020-1011-4

Calvo, R., Seyedarabi, F., & Savva, A. (2016). Beyond web content accessibility guidelines. Expert accessibility reviews. *ACM International Conference Proceeding Series*, 77–84. https://doi.org/10.1145/3019943.3019955

Darmaputra, I. G. B. N. E., Wijaya, S. S., & Ayu, M. A. (2017). Evaluating the accessibility of provinces' e-government websites in Indonesia. *2017 5th International Conference on Cyber and IT Service Management, CITSM 2017*. https://doi.org/10.1109/CITSM.2017.8089322

Dehghanbanadaki, H., Seif, F., Vahidi, Y., Razi, F., Hashemi, E., Khoshmirsafa, M., & Aazami, H. (2020). Bibliometric analysis of global scientific research on Coronavirus (COVID-19). *Medical Journal of the Islamic Republic of Iran*, *34.51*. https://doi.org/10.34171/mjiri.34.51

Dida, S., Hafiar, H., Kadiyono, A. L., & Lukman, S. (2021). Gender, education, and digital generations as determinants of attitudes toward health information for health workers in West Java, Indonesia. *Heliyon*, *7*(1). https://doi.org/10.1016/j.heliyon.2021.e05916

Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., Mahfud, C., Sinapoy, M. S., Djalante, S., Rafliana, I., Gunawan, L. A., Surtiari, G. A. K., & Warsilah, H. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*, *6*, 100091. https://doi.org/10.1016/j.pdisas.2020.100091

Dobransky, K., & Hargittai, E. (2021). Piercing the Pandemic Social Bubble: Disability and Social Media Use About COVID-19. *American Behavioral Scientist*, 1–23. https://doi.org/10.1177/00027642211003146

Epstein, S., Ayers, K., & Swenor, B. K. (2021). COVID-19 vaccine prioritisation for people with disabilities. *The Lancet Public Health*, *6*(6), e361. https://doi.org/10.1016/S2468-2667(21)00093-1

Fernández-Díaz, E., Iglesias-Sánchez, P. P., & Jambrino-Maldonado, C. (2020). Exploring who communication during the COVID 19 pandemic through the who website based on W3C guidelines: Accessible for all? *International Journal of Environmental Research and Public Health*, *17*(16), 1–17. https://doi.org/10.3390/ijerph17165663

Gleason, J., Ross, W., Fossi, A., Blonsky, H., Tobias, J., & Stephens, M. (2021). The Devastating Impact of Covid-19 on Individuals with intellectual disabilities in the United States. *NEJM Catalyst*

Innovations in Care Delivery. https://doi.org/10.1056/CAT.21.0051

Goodwin, M., Susar, D., Nietzio, A., Snaprud, M., & Jensen, C. S. (2011). Global web accessibility analysis of national government portals and ministry web sites. *Journal of Information Technology and Politics*, *8*(1), 41–67. https://doi.org/10.1080/19331681.2010.508011

Hafiar, H., Subekti, P., Setianti, Y., & Amin, K. (2022). Aksesibilitas website dan reputasi online marketplace reksadana. *PRofesi Humas Jurnal Ilmiah Ilmu Hubungan Masyarakat*, *6*(2), 197. https://doi.org/10.24198/prh.v6i2.35708

Haman, M. (2020). The use of Twitter by state leaders and its impact on the public during the COVID-19 Pandemic. *Heliyon*, *6*(11), e05540. https://doi.org/10.1016/j.heliyon.2020.e05540

Houtrow, A., Harris, D., Molinero, A., Levin-Decanini, T., & Robichaud, C. (2020). Children with disabilities in the United States and the COVID-19 Pandemic. *Journal of Pediatric Rehabilitation Medicine*, *13*(3), 415–424. https://doi.org/10.3233/PRM-200769

Ilhan, U., Iseri, E. I., & Uyar, K. (2020). Web Accessibility of e-Government Portals and Ministry Websites of the Cyprus Island. *4th International Symposium on Multidisciplinary Studies and Innovative Technologies, ISMSIT 2020 - Proceedings*. https://doi.org/10.1109/ISMSIT50672.2020.9254996

Indriani, S. S., & Prasanti, D. (2020). Analisis konvergensi simbolik dalam media sosial youth group terkait kasus COVID-19 di Indonesia. *Jurnal Kajian Komunikasi*, *8*(2), 179. https://doi.org/10.24198/jkk.v8i2.27271

Islam, M. S., Kamal, A. H. M., Kabir, A., Southern, D. L., Khan, S. H., Murshid Hasan, S. M., Sarkar, T., Sharmin, S., Das, S., Roy, T., Harun, M. G. D., Chughtai, A. A., Homaira, N., & Seale, H. (2021). COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. *PLoS ONE*, *16*(5), e0251605. https://doi.org/10.1371/journal.pone.0251605

Ismail, A., & Kuppusamy, K. S. (2019). Web accessibility investigation and identification of major issues of higher education websites with statistical measures: A case study of college websites. *Journal of King Saud University - Computer and Information Sciences*, *xxxx*. https://doi.org/10.1016/j.jksuci.2019.03.011

Ismail, A., Kuppusamy, K. S., & Nengroo, A. S. (2018). Multi-tool accessibility assessment of government department websites:a case-study with JKGAD. *Disability and Rehabilitation: Assistive Technology*, *13*(6), 504–516. https://doi.org/10.1080/17483107.2017.1344883

Kamoun, F., & Almourad, M. B. (2014). Accessibility as an integral factor in e-government web site evaluation: The case of Dubai e-government. *Information Technology and People*, *27*(2), 208–228. https://doi.org/10.1108/ITP-07-2013-0130

Kim, H. K., Ahn, J., Atkinson, L., & Kahlor, L. A. (2020). Effects of COVID-19 Misinformation on Information Seeking, Avoidance, and Processing: A Multicountry Comparative Study. *Science Communication*, *42*(5), 586–615. https://doi.org/10.1177/1075547020959670

Król, K., & Zdonek, D. (2020). Local Government Website Accessibility—Evidence from Poland. *Administrative Sciences*, *10*(2), 22. https://doi.org/10.3390/admsci10020022

Kulkarni, M. (2019). Digital accessibility: Challenges and opportunities. *IIMB Management Review*, *31*(1), 91–98. https://doi.org/10.1016/j.iimb.2018.05.009

Latif, M. H. A., & Masrek, M. N. (2010). Accessibility Evaluation on Malaysian E-Government Websites. *Journal of E-Government Studies and Best Practices*, *2010*.

Leist, E., & Smith, D. (2014). Accessibility issues in e-Government. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *8650 LNCS*, 15–25.

https://doi.org/10.1007/978-3-319-10178-1_2

Li, S. H., Yen, D. C., Lu, W. H., & Lin, T. L. (2012). Migrating from WCAG 1.0 to WCAG 2.0 - A comparative study based on Web Content Accessibility Guidelines in Taiwan. *Computers in Human Behavior*, *28*, 87–96. https://doi.org/10.1016/j.chb.2011.08.014

Lim, J. L., Ong, C. Y., Xie, B., & Low, L. L. (2020). Estimating information seeking-behaviour of public in malaysia during COVID-19 by using google trends. *Malaysian Journal of Medical Sciences*, *27*(5), 202–204. https://doi.org/10.21315/mjms2020.27.5.16

Limilia, P., & Pratamawaty, B. B. (2020). Google Trends and Information Seeking Trend of COVID-19 in Indonesia. *Jurnal ASPIKOM*, *5*(2), 188–205. https://doi.org/10.24329/aspikom.v5i2.741

Masyhur, F. (2015). Evaluasi Aksesibilitas Website Resmi Kementerian Dan Lembaga Menggunakan Pedoman WCAG 2. 0. *Temu Ilmiah Peneliti Kominfo 2015*.

Nasir, N. M., Baequni, B., & Nurmansyah, M. I. (2020). Misinformation Related To Covid-19 in Indonesia. *Jurnal Administrasi Kesehatan Indonesia*, *8*(1 Special Issue), 51–59. https://doi.org/10.20473/jaki.v8i2.2020.51-59

Preston, S., Anderson, A., Robertson, D. J., Shephard, M. P., & Huhe, N. (2021). Detecting fake news on Facebook: The role of emotional intelligence. *PLoS ONE*, *16*(3), e0246757. https://doi.org/10.1371/journal.pone.0246757

Prihantoro, E., Ramadhani, R. W., Haryanti, D. A., & Ningsih, T. W. R. (2022). Analisis faktor pendukung knowledge sharing menggunakan Whatsapp dan Line group saat pandemi Covid-19. *Jurnal Manajemen Komunikasi*, *6*(2), 200–220. https://doi.org/10.24198/jmk.v6i2.32241

Puspitasari, K., & Irwansyah, I. (2022). Fleksibilitas interpretatif teknologi web 2.0 bagi pengelola media sosial instansi pemerintah. *PRofesi Humas Jurnal Ilmiah Ilmu Hubungan Masyarakat*, *6*(2), 220–242. https://doi.org/10.24198/prh.v6i2.28623

Rodríguez, C. P., Carballido, B. V., Redondo-Sama, G., Guo, M., Ramis, M., & Flecha, R. (2020). Untold false news around COVID-19 circulated less on sina weibo than on twitter. How to overcome false information? *International and Multidisciplinary Journal of Social Sciences*, *9*(2), 1–22. https://doi.org/10.17583/rimcis.2020.5386

Rømen, D., & Svanæs, D. (2012). Validating WCAG versions 1.0 and 2.0 through usability testing with disabled users. *Universal Access in the Information Society*, *11*, 375–385. https://doi.org/10.1007/s10209-011-0259-3

Rotas, E. E., & Cahapay, M. (2021). Managing the Mental Health of Persons with Disabilities amid the COVID-19 Pandemic in the Philippines: Specific Factors and Key Actions. *European Journal of Environment and Public Health*, *5*(2), em0077. https://doi.org/10.21601/ejeph/10954

Sabatello, M., Landes, S. D., & McDonald, K. E. (2020). People With Disabilities in COVID-19: Fixing Our Priorities. *American Journal of Bioethics*, *20*(7), 187–190. https://doi.org/10.1080/15265161.2020.1779396

Sakellariou, D., Malfitano, A. P. S., & Rotarou, E. S. (2020). Disability inclusiveness of government responses to COVID-19 in South America: A framework analysis study. *International Journal for Equity in Health*, *19*(1), 1–10. https://doi.org/10.1186/s12939-020-01244-x

Samaha, A. M. (2007). What good is the social model of disability? *University of Chicago Law Review*, *74*(4), 1251–1308. https://doi.org/10.2307/20141862

Shakespeare, T., Ndagire, F., & Seketi, Q. E. (2021). Triple jeopardy: disabled people and the COVID-19 Pandemic. *The Lancet*, *397*(10282), 1331–1333. https://doi.org/10.1016/S0140-6736(21)00625-5

Sims, G. (2016a). *Accessibility Prioritization: Laying the Foundation with a Strategic Plan [Part 1]*.

Sims, G. (2016b). *Accessibility Prioritization:*

Your Tactical Roadmap [Part 2].

Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S. (2021). From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. *Information Processing and Management*, *58*(2), 102440. https://doi.org/10.1016/j.ipm.2020.102440

Sumartias, S., Hafiar, H., Amin, K., Limilia, P., & Prastowo, A. A. (2022). Labour union's website accessibility and information rights fulfilment among workers with disability. *Jurnal Studi Komunikasi*, *6*(3), 859–870. https://doi.org/10.25139/jsk.v6i3.4952

Susilo, D., Putranto, T. D., & Navarro, C. J. S. (2021). Performance of Indonesian Ministry of Health in Overcoming Hoax About Vaccination Amid the COVID-19 Pandemic on Social Media. *Nyimak: Journal of Communication*, *5*(1), 151–166. https://doi.org/DOI: http://dx.doi.org/10.31000/nyimak.v5i1.4100

Taylor, Z. W. (2019). Web (in)accessible: Supporting access to Texas higher education for students with disabilities. *Texas Education Review*, *7*(2), 60–75. https://doi.org/http://dx.doi.org/10.26153/tsw/2285

Velásquez, J. D., Estévez, P. A., Yasuda, H., Aoki, T., & Vera, E. (2004). Intelligent Web Site: Understanding the Visitor Behavior. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *3213*, 140–147. https://doi.org/10.1007/978-3-540-30132-5_24

Wu, J. H., & John, S. D. (2021). The Ethics of COVID-19 Risk Communication. *Journal of General Internal Medicine*, *36*(4), 1092–1093. https://doi.org/10.1007/s11606-021-06600-3

Zhao, X., Fan, J., Basnyat, I., & Hu, B. (2020). Online Health Information Seeking Using "#COVID-19 Patient Seeking Help" on Weibo in Wuhan, China: Descriptive Study. *Journal of Medical Internet Research*, *22*(10), e22910. https://doi.org/10.2196/22910

Zimmerman, M. S., & Shaw jr, G. (2019). Health information seeking behaviour: a concept analysis. *Health Information and Libraries Journal*. https://doi.org/10.1111/hir.12287