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ACCESSIBILITY CHALLENGES IN DIGITAL SCHOOL NEWSPAPER INFORMATION SYSTEMS: PERSPECTIVES ON INCLUSIVE EDUCATION AND STUDENTS WITH DISABILITIES

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Abstract: The increasing use of digital platforms in educational environments has created new opportunities for schools to disseminate information, publish student-generated content, and facilitate communication within school communities. Digital school newspapers represent one such platform, providing access to school news, educational articles, announcements, photographs, and multimedia publications. However, the availability of digital information does not necessarily ensure equal access for students with disabilities. This study reviews literature on digital accessibility, inclusive education, and accessibility evaluation of educational and information systems to identify challenges relevant to digital school newspaper information systems. A literature-based review approach was employed to synthesize selected studies concerning educational websites, learning management systems, digital news websites, digital libraries, assistive technologies, and inclusive digital design. The findings were organized using the four principles of the Web Content Accessibility Guidelines (WCAG): Perceivable, Operable, Understandable, and Robust. The reviewed literature identifies recurring accessibility barriers, including insufficient color contrast, missing alternative text, inaccessible keyboard navigation, unclear interface labels, inadequate content structures, and compatibility problems with assistive technologies. Studies also indicate that accessibility is influenced by institutional factors, such as limited resources, insufficient digital accessibility training, and the absence of systematic accessibility management. Research evaluating Indonesian news websites further demonstrates that accessibility barriers remain present in digital news environments, particularly in keyboard navigation, non-text content, and color contrast. Nevertheless, direct research addressing digital school newspaper information systems and the experiences of school students with disabilities remains limited in the reviewed literature. This study highlights the need to integrate WCAG-based accessibility requirements, inclusive design principles, accessible editorial practices, and user participation into the development of digital school newspaper information systems.

Keyword: digital accessibility; digital school newspaper; inclusive education; students with disabilities; WCAG 2.2; information systems.

INTRODUCTION

Digital transformation has significantly changed how educational institutions produce, manage, and distribute information. Websites and digital information systems are increasingly used to provide academic information, institutional announcements, learning resources, and news about educational activities. In this context, digital school newspapers offer an opportunity for schools to publish information through online platforms and encourage students to participate in journalistic activities, including writing, editing, reporting, and documenting school events.

Compared with printed publications, digital school newspapers can distribute information more rapidly and incorporate different forms of

content, such as text, photographs, infographics, audio recordings, and video reports. These characteristics provide opportunities to expand student participation and improve access to school information. However, digital publication does not automatically create an inclusive information environment. Students with disabilities may encounter barriers when websites and digital content are not designed to accommodate different sensory, physical, and cognitive requirements.

Digital accessibility is therefore an important consideration in educational information systems. Students with visual impairments may experience difficulties when images lack alternative text, page structures are not compatible with screen readers, or text and background colors have insufficient contrast. Students with hearing impairments may not receive complete information from audio and video content when captions or transcripts are unavailable. Students with motor disabilities may encounter difficulties when websites require mouse-based interaction or do not provide accessible keyboard navigation. Meanwhile, students with cognitive or learning disabilities may experience barriers when information is presented through complex layouts, inconsistent navigation, or difficult language.

Research on educational websites in Indonesia has identified several accessibility problems. Arini (2020) evaluated 20 university websites using AChecker and WCAG 2.0 and reported that 95% of the examined websites had problems with WCAG 2.0 Level AAA conformity. The findings indicate that accessibility requirements were not adequately addressed in many institutional websites, even though these websites function as important sources of academic information and university news.

Accessibility challenges are also evident in digital news environments. Dharmayanti et al. (2026) evaluated three Indonesian news websites: Detik.com, Kompas.com, and Tribunnews.com using WCAG 2.2 and the Website Accessibility Conformance Evaluation Methodology (WCAG-EM). Their study identified accessibility barriers affecting users with visual impairments, particularly keyboard accessibility, non-text content, and color contrast. The authors also reported that homepage pages generally presented more accessibility problems than article pages because of their greater complexity and the presence of interactive and advertisement-related components. This finding is particularly relevant to digital school newspapers because news platforms also depend on article navigation, content cards, photographs, and multimedia components.

Beyond technical website evaluation, accessibility is also influenced by institutional and organizational conditions. Maysaroh et al. (2025) , in a case study of an inclusive school in Indonesia, examined digital accessibility management through the Planning, Organizing, Actuating, and Controlling (POAC) approach. Their findings emphasize the importance of analyzing student needs, establishing responsible teams, providing digital training, and conducting regular evaluations. The study also identified limited resources as an obstacle to implementing digital accessibility. Muhammad Ananda Rafiq et al. (2025) provide another disability-specific perspective through the development of a voice-based application intended to improve information accessibility for visually impaired members of PERTUNI. Their Design Thinking approach demonstrates the importance of considering the interaction needs of users with visual impairments when developing information-access applications.

Research on school information systems also provides a relevant context for understanding digital school newspapers. Marsya & Nasution (2024) developed a website-based digital library information system for SMK Negeri 1 Tanjung Pura, demonstrating how web

platforms can organize and provide access to educational resources. Hendrawan et al. (2025) examined the usability of a school management information system for tuition payment monitoring and identified interface-related issues through usability testing and heuristic evaluation. These studies illustrate the role of digital information systems in supporting school information services, although they do not specifically evaluate disability accessibility. Similarly, Hendrawan et al. (2020) developed a website-based information system for student organizations at Universitas Pembangunan Panca Budi, demonstrating the use of web technology for information dissemination and organizational communication.

Although previous studies have examined educational websites, learning management systems, digital news websites, and digital accessibility management in inclusive schools, the reviewed literature provides limited direct evidence concerning the accessibility of digital school newspaper information systems. This is an important research concern because digital school newspapers combine the characteristics of educational information systems and digital publishing platforms. Their content includes news articles, student reports, photographs, infographics, interviews, videos, and school announcements, each of which may create specific accessibility requirements.

Based on this background, this study reviews accessibility challenges in digital information systems and discusses their implications for digital school newspapers from the perspectives of inclusive education and students with disabilities. The study addresses the following research questions:

1. What accessibility challenges are reported in educational websites, digital information systems, and digital publishing platforms relevant to students with disabilities?
2. How can the identified accessibility challenges be categorized according to the four principles of WCAG?
3. What implications do these accessibility challenges have for the design and development of inclusive digital school newspaper information systems?

METHODS

This study adopts a literature-based review approach to examine accessibility challenges in educational and digital information systems and their implications for digital school newspapers. The review draws on selected academic articles and research documents uploaded for the study, including literature on educational websites, learning management systems, digital news websites, digital libraries, assistive technologies, inclusive education, and accessible interface design.

The literature was examined according to its relevance to the research questions. Studies were considered relevant when they addressed at least one of the following areas: (1) accessibility evaluation of educational or information websites; (2) digital accessibility experiences of people with disabilities; (3) WCAG-based evaluation and accessibility tools; (4) inclusive design and assistive technologies; and (5) institutional management of digital accessibility.

The analysis was conducted through thematic synthesis. First, the studies were classified according to their research context, objectives, methodology, accessibility standards, target users, and reported findings. Second, the accessibility barriers identified in the literature were grouped according to the four WCAG principles: Perceivable, Operable, Understandable, and Robust. Third, the findings were compared across different user groups and digital platform types. Finally, the synthesized findings were interpreted in relation to the functions and content characteristics of digital school newspaper

information systems.

The review also considered institutional and organizational factors, including resource availability, teacher training, accessibility awareness, and school-level management. These factors were included because accessibility depends not only on technical implementation but also on the processes through which digital content is produced, published, and maintained.

This study is a literature-based thematic review of the selected uploaded sources. It does not claim to be an exhaustive systematic review of all publications in the field, nor does it constitute a direct accessibility audit of existing digital school newspaper websites. Accordingly, the implications for digital school newspapers are derived from evidence reported in related educational and digital publishing contexts.

RESULTS AND DISCUSSION

Characteristics of the Reviewed Literature

The reviewed literature covers several research contexts, including university websites, learning management systems, educational platforms, digital news websites, digital libraries, inclusive schools, and assistive technologies. These contexts provide complementary evidence for understanding accessibility challenges in digital information systems.

The studies can be broadly grouped into three categories. The first category comprises technical evaluations of websites and digital platforms. Arini (2020) , Fithriyaningrum et al. (2022) , Nurhady & Putra (2025) , Akhsana & Setiaji (2025) , Singh et al. (2024) , and Dharmayanti et al. (2026) examine accessibility through WCAG-based evaluation and automated tools. Their findings provide evidence of recurring interface and content barriers.

The second category focuses on the experiences and accessibility needs of users with disabilities. Maina et al. (2026) investigate students' experiences in accessing digital library resources in selected public universities in Kenya. Their study highlights the importance of institutional infrastructure, policy frameworks, and staff engagement. Research on screen readers, hearing accessibility, cognitive accessibility, and remote education further expands the understanding of different user requirements.

The third category concerns inclusive design and institutional accessibility management. Maysaroh et al. (2025) examine digital accessibility management in an Indonesian inclusive school, while Gilbert (2019), Gronseth (2018), and Mosher (2023) provide conceptual perspectives on inclusive digital design.

The combination of these research categories allows accessibility to be understood as a socio-technical issue involving digital content, interface design, assistive technologies, user characteristics, and institutional practices.

Accessibility Challenges Based on WCAG Principles

Perceivable: Barriers in Text and Multimedia Content

The Perceivable principle concerns whether information can be accessed through users' available sensory abilities. The reviewed studies repeatedly identify problems involving color contrast, missing alternative text, and inaccessible non-text content.

Arini (2020) identifies accessibility problems in Indonesian university websites, while Fithriyaningrum et al. (2022) report low contrast and missing image explanations in learning management system websites. Nurhady & Putra (2025) also identify non-text content and color contrast as important issues in Platform Merdeka Mengajar.

The findings from digital news websites provide further evidence. Dharmayanti et al. (2026) report non-text

content and color contrast violations in the three evaluated Indonesian news websites. These problems are particularly relevant to digital school newspapers because photographs, illustrations, infographics, and visual announcements are common forms of news content.

For example, a photograph documenting a school activity may communicate important information about the event and its participants. If the image is not accompanied by an appropriate text alternative, students using screen readers may not receive equivalent information. Similarly, infographics should provide textual information so that essential content is not communicated exclusively through visual elements.

Multimedia accessibility is also important. Video reports and audio interviews should provide captions or transcripts to support students with hearing impairments and users who cannot access audio content. Downloadable PDF publications should also be prepared with accessible document structures and meaningful alternative text.

These findings indicate that accessibility should be considered during content production, rather than being addressed only after the publication has been uploaded.

Operable: Navigation and Interaction Barriers

The Operable principle concerns the ability of users to navigate and interact with digital systems through different input methods.

Dharmayanti et al. (2026) identify keyboard accessibility as the most dominant accessibility issue in their evaluation of Indonesian news websites. Their findings are particularly relevant because news websites contain multiple navigation components, including menus, article cards, category links, and interactive controls.

Fithriyaningrum et al. (2022) and Akhsana & Setiaji (2025) also identify problems related to unclear link descriptions. Such issues can make it difficult for users to understand the purpose of links and navigate through information efficiently.

In digital school newspapers, operability should be considered across the homepage, article categories, search functions, article pages, image galleries, pagination, and multimedia controls. Users should be able to operate these components using a keyboard without depending entirely on a mouse. Visible focus indicators and descriptive control labels are also important.

The findings suggest that a visually attractive interface is not necessarily an operable interface. Digital school newspaper systems therefore need to be evaluated using keyboard navigation and, where appropriate, assistive technology testing.

Understandable: Content Structure and Cognitive Accessibility

The Understandable principle emphasizes that information and interface operations should be clear, readable, and predictable.

Nurhady & Putra (2025) identify problems involving headings, labels, link purpose, and information relationships in Platform Merdeka Mengajar. These findings indicate that the organization of information is an important part of digital accessibility.

Moreno et al. (2021) provide an additional perspective through research on interface design for people with cognitive disabilities. Their work supports the importance of designing interfaces that accommodate different cognitive needs.

For digital school newspapers, understandable content should include meaningful headlines, logical heading structures, short and readable paragraphs, descriptive image captions, and consistent article categories. News articles should avoid unnecessary complexity and should organize information in a way that supports comprehension.

Students with cognitive or learning disabilities may experience difficulties

when content is dense, navigation is inconsistent, or interface labels are ambiguous. Therefore, content accessibility should include readability and information organization, not only technical compliance.

Robust: Compatibility with Assistive Technologies

The Robust principle concerns whether digital content can be interpreted reliably by different user agents and assistive technologies.

Dutta (2025) discusses NVDA as an open-source screen reader that supports access to digital resources for visually impaired users. Romero (2024) demonstrate the importance of combining automated evaluation with manual keyboard and screen-reader testing. Nurhady & Putra (2025) identify issues involving element naming and information relationships, which are relevant to the structural implementation of digital interfaces.

For digital school newspapers, robust implementation requires semantic HTML, meaningful heading structures, accessible links, correctly named interface controls, and compatible document formats. Embedded videos, galleries, and interactive components should also be tested with relevant assistive technologies.

The findings suggest that compatibility cannot be determined solely from the visual appearance of a website. A publication may appear visually correct while remaining difficult to interpret through screen readers or other assistive technologies.

Comparative Synthesis of Accessibility Studies

Table 1 presents a comparative synthesis of selected studies that provide evidence relevant to digital school newspaper accessibility.

Table 1 Comparative Synthesis of Selected Accessibility Studies

Author(s) and Year	Research Context	Method or Framework	Main Findings	Relevance to Digital School Newspapers
Arini (2020)	20 Indonesian university websites	AChecker; WCAG 2.0	95% of examined websites had problems with WCAG 2.0 Level AAA conformity.	Demonstrates accessibility concerns in institutional information websites.
Fithriyaningrum et al. (2022)	LMS websites from 30 Indonesian universities	WAVE; WCAG 2.1	Problems involving contrast, image descriptions, link descriptions, and form/button labels.	Relevant to article images, links, and interactive publication elements.
Singh et al. (2024)	13 educational board websites	Multiple accessibility evaluation tools	Identified accessibility problems, including text and non-text contrast issues.	Supports the use of multiple evaluation methods for school information websites.
Romero (2024)	Five educational platforms	Automated evaluati	Examined accessibility issues through automated	Demonstrates the value of combining

		on, manual testing, and user validation	tools, keyboard and screen-reader testing, and user validation.	technical evaluation and user-based testing.
Nurhady & Putra (2025)	Platform Merdeka Mengajar	WCAG 2.2	Reported 450 accessibility issues across 94 pages, including non-text content, contrast, headings, and labels.	Provides recent evidence from an Indonesian educational platform.
Akhsana & Setiaji (2025)	Seven Indonesian university admission websites	WCAG-related evaluation methods	Identified issues involving link purpose, non-text content, information relationships, text resizing, and contrast.	Relevant to accessible navigation and content presentation.
Maysaroh et al. (2025)	Inclusive school in Indonesia	Qualitative case study; POAC	Identified the importance of needs analysis, responsible teams, training, and regular evaluation.	Supports school-level accessibility management.
Dharmayanti et al. (2026)	Three Indonesian news websites	WCAG 2.2; WCAG-EM; WAVE, axe, Siteimprove	Keyboard accessibility was the most dominant issue, followed by non-text content and color contrast.	Provides the closest direct evidence from digital news platforms.
Maina et al. (2026)	Digital libraries in six Kenyan public universities	Qualitative user-experience study	Examined students' experiences in relation to infrastructure, policy, and staff engagement.	Adds a user-centered perspective on digital information access.

The comparison reveals that accessibility problems are not limited to one type of digital platform. Similar issues appear in educational websites, learning management systems, and digital news websites. The findings also indicate that automated evaluation is useful for identifying technical barriers, while qualitative and user-based approaches provide insight into how these barriers affect actual users.

Accessibility Challenges Across Disability Groups

The reviewed literature indicates that accessibility barriers differ according to users' needs and the formats of digital content.

For students with visual impairments, the most relevant issues include missing alternative text, insufficient contrast, inaccessible document structures, and compatibility with screen readers. Studies by Arini (2020), Fithriyaningrum et al. (2022), Nurhady & Putra (2025), and

Dharmayanti et al. (2026) provide evidence of these problems in Indonesian digital platforms.

For students with hearing impairments, accessibility depends on the availability of captions, transcripts, and visual alternatives for audio information. These requirements are particularly important for digital school newspapers that publish interviews, video reports, and recorded announcements. Research by Ronquillo et al. (2025) and Gupta et al. (2026) provides relevant perspectives on accessible digital media for students with hearing impairments.

For students with motor disabilities, keyboard accessibility and interaction design are important considerations. Dharmayanti et al. (2026) identify keyboard accessibility as a major issue in Indonesian news websites, while Zdravkova et al. (2022) discuss the broader accessibility challenges experienced by learners with special needs in remote education environments.

For students with cognitive or learning disabilities, the structure and presentation of information are important. Moreno et al. (2021) provide a basis for understanding the need for accessible user interfaces for people with cognitive disabilities. In digital school newspapers, this may involve clear headlines, readable language, predictable navigation, and consistent content structures.

These findings suggest that digital school newspaper accessibility should not focus exclusively on visual impairment. A comprehensive approach should consider multiple disability groups and different forms of content interaction.

Institutional and Organizational Challenges

Accessibility implementation is influenced by institutional readiness and the availability of appropriate resources. Maysaroh et al. (2025) demonstrate that digital accessibility management in inclusive schools requires student-needs analysis, team organization, digital training, and evaluation. Their findings also identify limited resources as an implementation challenge.

Maina et al. (2026) similarly highlight the importance of institutional infrastructure, policy frameworks, and staff engagement in supporting students with disabilities who access digital library resources. These findings indicate that digital accessibility requires institutional support rather than relying exclusively on individual users or technical developers.

In digital school newspaper environments, content is often produced collaboratively by students, teachers, editors, and school administrators. Without clear editorial guidelines, publications may contain images without alternative text, videos without captions, inaccessible PDF documents, and inconsistent article structures.

Therefore, schools should establish accessibility responsibilities within the editorial workflow. Teachers and student editors should receive guidance on accessible content production, while technical personnel should ensure that the publication platform supports accessible navigation, semantic structures, and assistive technology compatibility.

Implications for Inclusive Digital School Newspaper Information Systems

The synthesis of the reviewed literature suggests that accessibility should be integrated into digital school newspaper systems through technical, editorial, and institutional considerations.

First, the interface should provide accessible navigation. Menus, article categories, search functions, links, and interactive components should be clearly labeled and operable through keyboard interaction.

Second, digital news content should provide equivalent alternatives. Informative images should include meaningful alternative text, while video and audio materials should provide captions or transcripts. Infographics should not communicate essential information through visual elements

alone.

Third, article structures should support comprehension. Meaningful headlines, logical headings, readable paragraphs, consistent layouts, and clear language can improve access for students with diverse cognitive and learning needs.

Fourth, the system should support assistive technologies. Semantic HTML, meaningful element names, accessible document structures, and compatible multimedia controls should be incorporated into the technical development process.

Fifth, accessibility should be integrated into school publication management. Editorial guidelines, teacher training, student participation, and periodic evaluation can help ensure that accessibility is maintained as new content is published.

Table 2 Proposed Accessibility Considerations for Digital School Newspaper Systems

WCAG Principle	Potential Accessibility Barrier	Proposed Design Consideration
Perceivable	Images without meaningful text alternatives	Provide alternative text for informative photographs and illustrations.
Perceivable	Insufficient text and background contrast	Apply sufficient color contrast and avoid relying on color alone to communicate information.
Perceivable	Video and audio content without alternatives	Provide captions, transcripts, and equivalent accessible information.
Operable	Navigation dependent on mouse interaction	Ensure keyboard accessibility and visible focus indicators.
Operable	Unclear links and interactive controls	Use descriptive link text and accessible control names.
Understandable	Complex article structures	Apply logical headings, readable paragraphs, and consistent article layouts.
Understandable	Inconsistent navigation and content presentation	Maintain predictable navigation and consistent publication formats.
Robust	Incompatible structures and interface components	Use semantic HTML and test compatibility with assistive technologies.

The recommendations in Table 2 are derived from the accessibility barriers reported in the reviewed literature and interpreted for the digital school newspaper context. They should be understood as proposed design considerations rather than results of a direct evaluation of existing school newspaper systems.

Research Gaps

The reviewed literature provides evidence of accessibility challenges in educational websites, learning management systems, digital news platforms, and digital libraries. However, within the selected literature reviewed in this study, direct research specifically evaluating digital school newspaper information systems and their accessibility for school students with disabilities remains limited.

Four research gaps can be identified.

*First, a contextual gap exists***.** Most reviewed studies examine university websites, learning management systems, digital libraries, and general news websites. Digital school newspapers have specific publishing functions and school-

community users that require further investigation.

*Second, a content accessibility gap remains***.** Existing studies identify problems involving images, contrast, links, labels, and multimedia. However, the accessibility of school newspaper-specific content, including student-written articles, photo stories, infographics, interviews, and school activity reports, requires more focused examination.

*Third, a user-centered evidence gap exists***.** Several studies rely on automated evaluation tools, while others use qualitative or manual testing. Further research should involve students with different disabilities in evaluating the accessibility and usability of digital school newspaper systems.

*Fourth, an institutional integration gap is evident***.** Technical evaluations identify website-level accessibility problems, while inclusive school research emphasizes organizational management and training. Further studies can integrate these perspectives by examining how WCAG requirements, inclusive design principles, user needs, and school editorial practices can be incorporated into a unified information system design approach.

These research gaps are inferred from the selected literature reviewed in this article. They do not establish that no previous research on digital school newspapers exists in other databases or publications.

CONCLUSION

This study reviewed accessibility challenges in educational and digital information systems and examined their implications for digital school newspaper information systems from the perspectives of inclusive education and students with disabilities.

The reviewed literature identifies recurring accessibility barriers across educational websites, learning management systems, digital news websites, and digital libraries. These barriers can be categorized according to the four WCAG principles. Under Perceivable, challenges include insufficient color contrast and missing text alternatives for non-text content. Under Operable, barriers include inaccessible keyboard navigation and unclear links or interactive controls. Under Understandable, issues involve headings, labels, content organization, and readability. Under Robust, semantic implementation and compatibility with assistive technologies remain important considerations.

The review also demonstrates that accessibility is influenced by institutional conditions, including resource availability, teacher training, accessibility awareness, and coordinated management. Consequently, inclusive digital school newspaper development should integrate technical accessibility, accessible editorial practices, user participation, and institutional support.

The main contribution of this study is the synthesis of accessibility evidence from educational and digital news environments to identify design considerations for digital school newspaper information systems. However, the reviewed studies mainly examine related digital platforms rather than school newspapers directly. Therefore, the proposed implications require further empirical validation through accessibility audits and user-based evaluations involving students with different disabilities.

Future research should investigate existing digital school newspaper platforms, identify the specific information and interaction needs of students with disabilities, and develop an inclusive design framework that integrates WCAG requirements with school publishing processes.

Such research can contribute to the development of more accessible, participatory, and inclusive digital information systems in educational environments.

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