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Ensuring Digital Accessibility in Higher Education: Legal Challenges and Emerging AI-Based Solutions for Students with Disabilities

Abstract
Digital accessibility is a key component in inclusive higher education as students rely more and more on the institutional websites, learning management systems, digital documents, multimedia, and AI-supported learning environments. This study investigates digital accessibility in terms of technical, legal and institutional evidence for students with disability. The mixed methods design employed was secondary data. The DD-WARF Accessibility Dataset was quantitatively analyzed, with the results of the WAVE assessment of 348 university websites, and Lighthouse mobile and desktop scores. Legal challenges were analyzed using an OCR corpus of 68 documents compiled to 29 case-level documents, and IPEDS 2024–25 data was used to offer contextual evidence of disability-service URLs and distance education. The results revealed high and very high risk websites (31.61%) and accessibility barriers were present across the board, particularly Missing Perceivable and Missing Operable WCAG failures. From the OCR findings, the following were present in all cases: web accessibility, document accessibility, WCAG compliance, policy, monitoring, and remediation. IPEDS verified that digital and disability-service infrastructure plays a key role in the functioning of the institution. The study ends with a conclusion that accessibility needs governance, humanreviewed remediation, regular audits and responsible tools with AI support, and not just the automated scores. It provides a realistic strategy for institutional accessibility planning, which is guided by the law.It provides a practical approach to legally-informed institutional accessibility planning.

1. Introduction

Digital accessibility has become a central requirement of inclusive higher education because academic participation now depends heavily on websites, learning management systems, digital documents, online applications, multimedia resources, and AI-supported learning environments. These systems have the potential to increase access or they can replicate disenfranchisement for students with disabilities. Flexibility and increased participation in online learning does not necessarily mean that it is socially inclusive, usable or equitable in terms of the educational experience for all. Online student students with disabilities demonstrate that access to the online environment does not solely equate with isolation and unmet supports, but can be a part of a technical delivery problem when institutions perceive online participation as a problem of access instead of an inclusive education environment (Kotera et al., 2021). This concern has become more relevant with the increased use of hybrid and online education infrastructure and services, as well as the increased importance of online communication in higher education institutions.

The problem of accessibility does not apply to each Web page or to each technical problem. It's an institutional capacity issue as well. Whether digital learning environments are accessible in practice depends on the faculty and staff who develop course materials, upload the PDFs, design assignments, manage learning platforms and communicate with students. The review of faculty competence on digital accessibility revealed that training is typically needed to cover disability awareness, legislation, accessible digital resources, and inclusive learning environments, suggesting that knowledge of disability and institutional policies is as important as the technology itself (Bong & Chen, 2024). Likewise, during the COVID-19 pandemic, studies on the accessibility management of university buildings revealed that students, faculty and employees with disabilities were also experiencing accessibility issues, even when there was a legal requirement for accessibility, partly because the management of accessibility was not always consistent (Lazar, 2022). The results bring the issue of digital accessibility to the forefront of governance, which includes a range of actions such as policy, training, monitoring, procurement, remediation and accountability. The legal risk only exacerbates the issue. E-learning systems bring up a number of legal issues, such as access of the students, data protection and privacy, and governance of the platforms. As e-learning is integrated into the mainstream of higher education provision, student accessibility is one of the key issues that has been raised in comparative legal analysis of elearning (Chan & Lei, 2023). Additionally, the governance of disability rights is also different across jurisdictions, and the law increasingly mandates that institutions consider accessibility as an obligation and not an act of choice, which is linked to equality, participation and nondiscrimination (Ferri & Subic, 2023). This can, of course, cause educational harm and legal liability to higher education stakeholders who have an inaccessible website, document, video, form or learning platform.

Meanwhile, AI has brought new opportunities to assist with accessibility. With careful use, generative AI can provide students with disabilities with personalized explanations, help them draft their work, provide help with understanding, and support Universal Design for Learning practices (Ayala, 2023). AI, however, comes with its own set of risks, though. The focus on human-centered governance, privacy protection, validation, transparency, and institutional readiness for the use of generative AI in education are more prominent than uncritical adoption (Holmes & Miao, 2023). It is important to keep in mind this difference in accessibility situations: AI-generated alt text, captions, document remediation, accessibility scans, or learning supports can enhance productivity, but if inaccurate or unchecked, can present new barriers. AI should be viewed as a tool to assist accessibility efforts rather than as a solution to replace compliance, expert review or student validation.

The problem addressed in this study is that higher education institutions face overlapping technical, legal, and operational challenges in ensuring digital accessibility for students with disabilities. There are previous works on online learning, training for faculty, legal risk, accessibility management, and tools that support learning with the help of AI, but there is a need for an integrated analysis of all of these, as they are linked by the barriers to online learning observed on the websites, the legal accessibility themes, the institutional digital environment, and the new AI-based solutions. Recent studies on accessible and inclusive online learning reveal that online learning can help disabled learners in unique ways, while the readiness of institutions and the accessibility of learning online are still unclear issues (Lomellini et al., 2025). This study fills this gap by using a mixed methods approach based on quantitative accessibility evidence, legal-document analysis, and institutional-context indicators.

This study is designed to be focused. It does not involve gathering new survey or interview data, but uses secondary data. The DD-WARF data set is used to analyze identified barriers to access in University web sites. Recurring legal themes and compliance issues are identified through the use of OCR legal documents. The data from IPEDS are used as contextual evidence of the infrastructure of institutions related to digital and disability services. The study is not intended to suggest that automated tools, like WAVE or Lighthouse, can provide full accessibility audits, nor is it intended to suggest that IPEDS assesses the quality of accessibility of institutional websites. It also does not evidence test AI interventions. Instead, AI-based solutions are regarded as conceptual and governance oriented solutions based on patterns of accessibility and legal risk observed.

The importance of the study is due to the integrative approach. The study offers a framework for higher education leaders, accessibility coordinators, faculty, instructional designers, legal officials, and technology staff to grasp digital accessibility as an institutional obligation by linking technical accessibility failures, legal challenges, institutional context, and the potential for remediation through AI. The analysis also goes beyond identification of the barriers and establishes a framework

for responsible accessibility governance in the context of AI, highlighting the need for safeguards, human oversight, documentation and accountability.

This study is guided by three research objectives:

- To identify the most common digital accessibility barriers in higher education websites using automated accessibility indicators and WCAG-based groupings.
- To examine how legal documents frame digital accessibility challenges, including web accessibility, document accessibility, assistive-technology access, captioning, policy, monitoring, and remediation.
- To develop a conceptual AI-solution and governance framework that links accessibility barriers and legal risks with responsible, human-reviewed AI-supported remediation strategies.

2. Literature Review

In recent years, the literature around digital accessibility in higher education has begun to take a broader view of accessibility as an institutional, pedagogical, legal, and technological issue and not a single, technical one. The swift shift to remote learning during COVID-19 highlighted the inequities in the preparedness of universities to adequately serve students with disabilities in the digital world. A mixed methods study of the transition online identified opportunities and barriers with disabilities students during the emergency remote learning period, such as flexibility on one hand and accessibility, communication, and support challenges on the other (Mullins & Mitchell, 2022). This is significant because it highlights that online delivery does not inherently create inclusion; it is the design of digital systems, instruction and institutional support structures for disabled learners which makes them accessible.

A related line of research highlights the importance of accommodations/disability related services for academic participation and success. Along with individual accommodations, a scoping review of disability-related services, accommodations, and integration in higher education revealed that institutional integration and support overall influence academic outcomes (Römhild & Holllederer, 2024). This aligns with the perspective that digital accessibility should be connected to disability services, pedagogical practices and studentsupport systems of institutions. Accessibility in this sense is not simply about a website meeting standards criteria, it is also about disabled students being able to fully and independently participate in educational life.

Studies of accessible digital practice also reveal that there must be sustainable barriers identification, prevention and correction processes within institutions. Seale (2020) suggests that there are four areas that need to be considered if accessible digital practices are to be improved: organizational culture, staff responsibilities, student participation, and the policy/practice gap. Likewise, the body of process oriented accessibility literature highlights that digital accessibility needs to be addressed by policy, procurement, training, monitoring and accountability processes and systems rather than by a single technical solution (Lazar et al., 2015). These contributions are directly relevant to higher education as they are operating complex digital ecosystems, such as websites, learning management systems, electronic documents, media platforms, library systems, application portals and third-party tools.

There are also ongoing gaps in the literature within the field of online accessibility that have been identified through systematic reviews of research on the topic in higher education. In her research review, she and Martin (2022) identified that accessibility of online higher education has been researched in three areas: technological, instructional, and learner support, but noted that certain issues continue to be encountered in implementation, assessment, and inclusive course design. The need for empirical studies that measure real barriers as opposed to assuming accessibility because of the existence of online systems is supported by this literature. It also justifies analysis based on WCAG (Web Accessibility Guidelines) as they are frequently the main entry points to educational participation.

AI is an additional complexity in the 'accessibility' discussion. The evidence base for the use of AI with students with identified disabilities is not uniform, and evidence-based practices should critically examine the ethical, bias, and implementation issues associated with the use of AI (Rice & Dunn, 2023). In more recent interview-based research with students with disabilities, generative AI was found to have a positive impact on autonomy, understanding, writing, and navigating academic tasks, but also concerns on accuracy, dependency, privacy, and unequal access to generative AI (Pierrès et al., 2025). Similarly, the integration of generative AI into the learning environment of students with disabilities in higher education suggests that these tools are already being used and are likely to impact accessibility, learning practices, and accessibility needs (Zhao et al., 2025).

There are significant opportunities for personalization, assistive interactions, and adaptive learning in the applications of artificial intelligence, virtual reality, and large language models in the field of special education, along with ethical, technical, and equity-related concerns (Voultsiou & Moussiades, 2025). The worries are not just concerning AI in education but are also part of broader discussions on educational technology, such as the potential for increased efficiency, personalization, and access to technology, as well as concerns about privacy, transparency, bias, academic integrity, and the reliance on AI tools (Verma et al., 2025). In digital access, it is not a solution, but an aid; AI must be assessed as such.

There is also a relationship between accessibility and broader sustainable development goals, such as equal access, participation and inequalities reduction (Senjam & Manna, 2024) in the literature of assistive technology and disability inclusion. This rights-based perspective aligns with the theory of inclusive education, which sees inclusive education not as a collection of technical adjustments, but as a way of thinking and implementing inclusive education in schools and institutions (Knight et al., 2024). Last but not least, the implementation of WCAG in organisational contexts shows that accessibility standards need to be translated into practical aspects, roles

and quality assurance processes of work flows (Bengtsson & Hammarberg, 2025). Overall, the literature suggests a comprehensive research on higher education accessibility, covering technical barriers of websites, legal and organizational hazards, and the proper application of AI-supported remediation in human governance.

3. Methodology

3.1 Research Design

The present study used a secondary data-based mixed methods design to analyze digital accessibility in higher education based on three complementary sources of evidence: automated web accessibility results, analysis of the legal documents, and institutional-context data. The quantitative component examined barriers to accessibility identified in the DD-WARF Accessibility Dataset with particular focus on WAVE and Lighthouse indicators. The qualitative-legal component analyzed OCR-processed legal documents to find legal issues, compliance themes and institutional responses to issues. A third contextual component involved using institutional data from IPEDS 2024–25 to place digital accessibility in the context of the broader higher-education infrastructure, such as the presence of a disabilityservices website and distance-education activity.

The design was integrative rather than experimental. The study did not include a test of the causal effectiveness of accessibility interventions based on AI. Rather, a conceptual link between observed barriers and legal risk, potential solutions supported by AI and required governance protections was made through empirical accessibility and legal-risk findings.

3.2 Data Sources

Three secondary data sets were used, one of which was reviewed, but not included in the final analysis. The first was the DD-WARF Accessibility Dataset that offered quantitative evidence from the WAVE results for 348 university websites, and Lighthouse scores for mobile and desktop, including accessibility errors, contrast issues, alerts, WCAG failures, and performance indicators (Acosta-Vargas, 2026).

Second, there were 68 documents aggregated into 29 case level records from an OCR-based legal corpus from the U.S. Department of Education Office for Civil Rights. These were reviewed to determine if there were any common legal themes, including WCAG compliance, screen-reader access, captioning, policy, training, monitoring and remediation (U.S. Department of Education, Office for Civil Rights, 2026).

Third, the IPEDS 2024–25 provisional Access database was used to provide institutional context based on data from HD2024 and IC2024, which include indicators of the presence of a website, application URLs, disability-services URLs, and distance-education indicators (National Center for Education Statistics, 2026).

The MASEM dataset was assessed for relevance to AI adoption and was not included in the analysis because it primarily focuses on general use of AI, not accessibility or compliance concerns (Yang, 2025).

3.3 DD-WARF Accessibility Analysis

The DD-WARF WAVE worksheet was cleaned to yield 348 records of university websites.Cleaning the DD-WARF WAVE worksheet included removing blank columns, standardizing variable names, validating rows and converting indicators to analyzable formats.

Core variables were WAVE Errors, Contrast Errors, Alerts, Features, HTML5/ARIA indicators, Structural Elements and WCAG criterion failures.

Total WAVE issues (Errors, Contrast Errors, Alerts) and total WCAG failures were derived and the criteria were organized into WCAG principles (Perceivable, Operable, Understandable, Robust). An accessibility-risk grouping variable was also created.

The Lighthouse dataset was processed separately, with cleaned mobile and desktop records (n = 696). The scores were validated (0-100) and standardized identifiers were used. The university and URL level data was combined from WAVE and Lighthouse. Descriptive statistics, WCAG summaries, correlations and paired mobile–desktop tests were performed and interpreted as associations rather than causation.

3.4 OCR Legal Corpus Analysis

The OCR legal PDF corpus was processed using Python-based PDF text extraction. Each document was converted into cleaned text, and metadata were recorded, including file name, page count, word count, document-type estimate, keyword flags, and legal-theme flags. The extraction process successfully processed all 68 PDFs without zero-text documents.

Because case identifiers extracted from document text were inconsistent in some files, case IDs were repaired using filename patterns. Documents were then aggregated into 29 case-level records. Each case was classified according to document structure, such as letter plus resolution agreement or letter plus resolution agreement plus supplement. Case-level keyword and legaltheme indicators were constructed by aggregating document-level flags.

A corrected case-year variable was also created. The first year detected inside OCR text was not used as the primary temporal variable because legal documents often contain historical, statutory, or policy dates that do not represent the case year. Instead, the recommended case year for analysis was derived from the repaired case ID. This corrected variable was used for the legal-case timeline.

3.5 IPEDS Institutional Context Analysis

IPEDS data were extracted from the Access database using an ODBC connection. Variables were selected from HD2024 and IC2024 based on relevance to institutional digital infrastructure, disability services, and distance education. The extracted dataset contained 6,072 institutional records. Raw IPEDS codes were recoded into labelled variables for interpretability. Institutional subsets were created for all records, active instructional institutions, and active four-year-or-above institutions.

Key indicators included the presence of an institutional website, online application URL, disability-services URL, distance-education course offerings, fully distance-education programs, undergraduate and graduate distance-education offerings, and disability-registration

threshold indicators. These measures were used only as contextual evidence. For example, the presence of a disability-services URL indicates institutional reporting of a disability-services web address, but it does not establish whether that web page is accessible.

3.6 Integration, AI Mapping, and Limitations

The final stage integrated findings across the three evidence streams. DD-WARF results identified technical accessibility barriers; OCR legal documents identified legal-risk and remediation themes; and IPEDS provided institutional context. These findings were used to construct an AI-solution mapping table linking accessibility problem areas to legal risks, AIsupported remediation categories, human review requirements, and safeguards. A governance framework was also developed to specify institutional controls, stakeholder responsibilities, acceptable AI uses, and prohibited overreliance on automated outputs.

Several limitations apply. Automated tools (WAVE, Lighthouse) are not a substitute for manual accessibility audits, screen-reader testing, keyboard testing or user validation. The DD-WARF dataset differs from IPEDS, which represents the U.S. institutional context, in that it does not reflect a geographic context. The OCR corpus is not an exhaustive sample of accessibility cases. Last, the solutions proposed in this study are conceptual ones based on empirical and legal patterns, and not assessed as implemented interventions.

4. Results

4.1 Quantitative Accessibility Findings from DD-WARF

A total of 348 university websites in 26 countries were analysed in the DD-WARF analysis. Results show that the accessibility barriers were not just a few isolated incidents. As summarized in Table 1, the mean number of total WAVE-detected issues was 90.71 per website, combining WAVE errors, contrast errors, and alerts. The average number of WCAG failures was 57.90, indicating that many websites had multiple criterion-level accessibility issues, not single point failures. Alerts had the highest mean of the WAVE categories, indicating that the accessibility risk was spread across both definite errors and the warnings that needed to be manually reviewed, indicating general errors and contrast errors.

Table 1. DD-WARF accessibility profile and detected risk distribution

Indicator	Result
University websites analyzed	348
Countries represented	26
Mean WAVE errors	19.99
Mean contrast errors	23.12
Mean alerts	47.60
Mean total WAVE-detected issues	90.71
Mean total WCAG failures	57.90
Minimal detected risk	27 websites, 7.76%
Low detected risk	93 websites, 26.72%
Moderate detected risk	118 websites, 33.91%
High detected risk	51 websites, 14.66%
Very high detected risk	59 websites, 16.95%

The risk distribution indicates that the majority of websites were detected as moderate risk, although there was a significant number detected as high or very high risk. When grouped together, high and very-high accounted for 110 websites (31.61%). This suggests that just under a third of the University's websites were rated as having a significant accessibility impairment which would need to be systematically remedied, rather than

simply fixed up. In addition, there were only 27 websites in the minimal risk category, which also indicates that low barrier digital accessibility was not the predominant category in the data set.

Figure 1 illustrates that the percentage of university websites with at least one failure detected in each WCAG principle are: Perceivable (91.09%), Operable (88.22%), Understandable (49.71%), and Robust (11.21%) failures, with the majority of failures in the ability to perceive and operate the digital content.

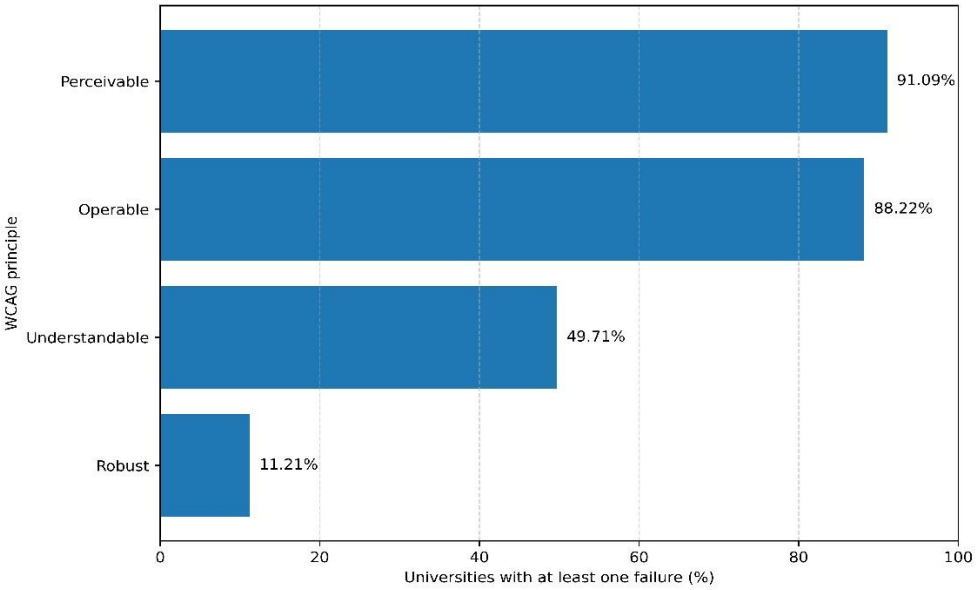

Figure 1. DD-WARF: University websites with WCAG principle failures.

4.2 WCAG Criterion and Principle-Level Patterns

The results of the WCAG criterion-level analysis indicates that accessibility issues were clustered in a few common barriers. As shown in Table 2, the most common criterion-level findings were WCAG 1.4.3 Contrast Minimum with 285 websites failing and 8,031 total failures. However, Link Purpose and Non-text Content were also found in large numbers (290 and 288 websites respectively). This combination is key as it involves both visual access and assistive-technology usability. Low contrast is an issue for users with low vision, as well as for those who have other visual processing requirements, and no text alternatives and unclear links are an issue for users who rely on screen-readers and keyboard-only navigation.

Table 2. Most frequent DD-WARF WCAG criterion failures

WCAG criterion	Universities affected	Percentage of websites	Total failures
1.4.3 Contrast Minimum	285	81.90%	8,031
2.4.4 Link Purpose	290	83.33%	4,513
1.1.1 Non-text Content	288	82.76%	4,376
1.3.1 Info and Relationships	200	57.47%	1,099
2.4.6 Headings and Labels	186	53.45%	812
3.3.2 Labels or Instructions	164	47.13%	656
4.1.2 Name, Role, Value	39	11.21%	376

The results of these findings suggest that accessibility risk does not only apply to surface level visual design. While contrast failures constitute the highest proportion of total failures, there are indications of structural and

navigational weaknesses in link purpose, non-text content, information relationships, headings, and form labels. These are especially important for students who are using screen reading, keyboard, magnification or other assistive technologies. The majority of the failures in the sample were at the WCAG principle level, with the failures at the Perceivable and Operable principles level predominating, which interpreted that many university websites pose difficulties to accessing information as well as to completing digital interactions.

Lighthouse Scores and Device-Level Differences

The Lighthouse results give a complementary view of website quality. The mean score for Lighthouse accessibility was around 80.80 and the mean score for performance was about 56.81. Accessibility scores should not be considered as evidence of accessibility compliance since automated scores are not a measure of all functional barriers. The direction of association of WAVE and Lighthouse, however, agrees with the general trend of the analysis.

Table 3 demonstrates that there is a negative correlation between total WCAG failures and Lighthouse accessibility scores; that is, websites that had more WAVE-detected failures for WCAG tended to have lower scores for accessibility.

Table 3. Lighthouse and WAVE-Lighthouse statistical findings

Analysis item	Result
Mean Lighthouse performance score	56.81
Mean Lighthouse accessibility score	80.80
Mean Lighthouse best-practices score	84.19
Mean Lighthouse SEO score	87.21
Total WCAG failures vs. Lighthouse accessibility, Pearson r	-0.342
Total WCAG failures vs. Lighthouse accessibility, Spearman rho	-0.388
Valid n for focused correlation	323
Mobile performance mean	51.15
Desktop performance mean	62.56
Desktop-minus-mobile performance difference	11.41
Mobile vs. desktop accessibility difference	0.09

The mobile–desktop comparison showed a large performance gap, with desktop performance scores exceeding mobile scores by 11.41 points. In contrast, the mobile–desktop accessibility difference was negligible. This suggests that accessibility defects were not limited to a single device mode, while performance problems were more pronounced in the mobile context.

4.4 Legal Challenges Identified in the OCR Corpus

The OCR legal corpus contained 68 documents aggregated into 29 case-level records. The caselevel results show that digital accessibility disputes involved multiple overlapping themes. As summarized in Table 4, web accessibility, document accessibility, WCAG compliance, policy/training/monitoring, and resolution or remedy appeared in all 29 cases. Screen-reader access appeared in 17 cases, while captioning access appeared in 14 cases. LMS or onlinelearning access appeared in one case, but this should not be interpreted as absence of risk; it reflects the specific content of this OCR corpus.

Table 4. OCR legal themes and IPEDS institutional context

Evidence area	Indicator	Result
OCR legal corpus	Web accessibility theme	29 cases, 100.00%
OCR legal corpus	Document accessibility theme	29 cases, 100.00%
OCR legal corpus	Policy, training, and monitoring theme	29 cases, 100.00%
OCR legal corpus	WCAG compliance theme	29 cases, 100.00%
OCR legal corpus	Resolution or remedy theme	29 cases, 100.00%
OCR legal corpus	Screen-reader access theme	17 cases, 58.62%
OCR legal corpus	Captioning access theme	14 cases, 48.28%
OCR legal corpus	LMS or online-learning theme	1 case, 3.45%
IPEDS context	Active institutions with disability-services URL	5,908 of 5,979, 98.81%
IPEDS context	Active institutions offering distance education	3,769 of 5,979, 63.04%
IPEDS context	Active four-year institutions with disabilityservices URL	2,774 of 2,796, 99.21%
IPEDS context	Active four-year institutions offering distance education	2,499 of 2,796, 89.38%

Legal accessibility challenges were not limited to website errors alone, as illustrated in Figure 2, since all cases contained themes related to web accessibility, document accessibility, WCAG compliance, policy, training, monitoring, and remedies.

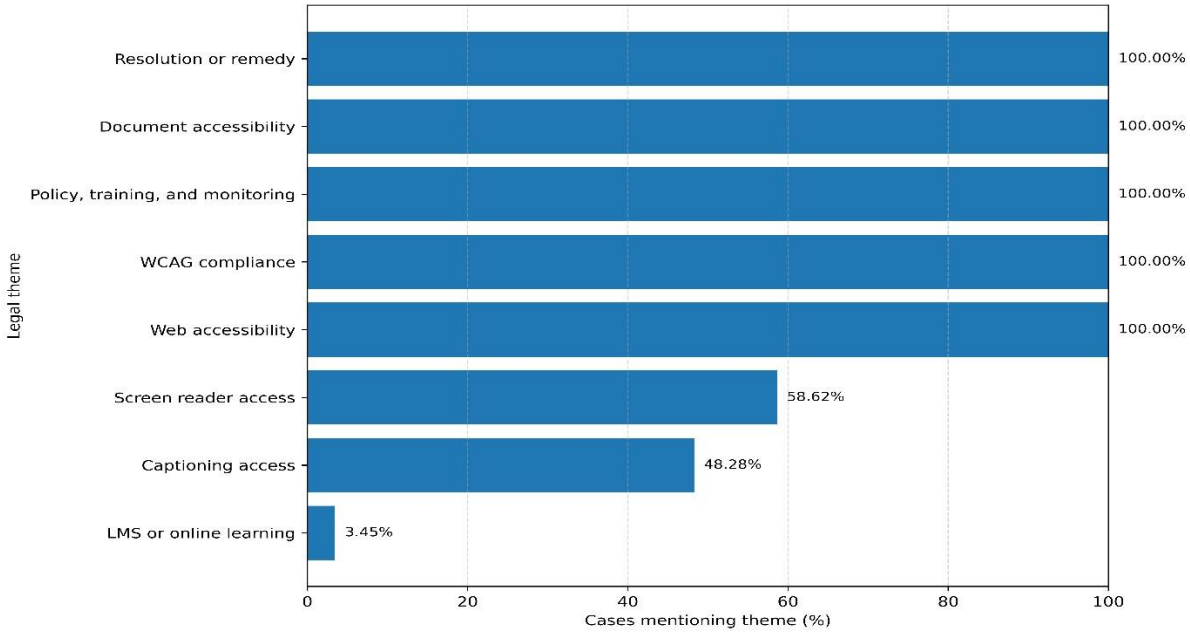

Figure 2. OCR legal corpus: prevalence of case-level legal themes.

The corrected legal-case timeline is shown in Figure 3, indicating that the corpus contained 2 cases from 2016, 15 from 2017, 2 from 2018, 2 from 2019, 4 from 2022, and 4 from 2023.

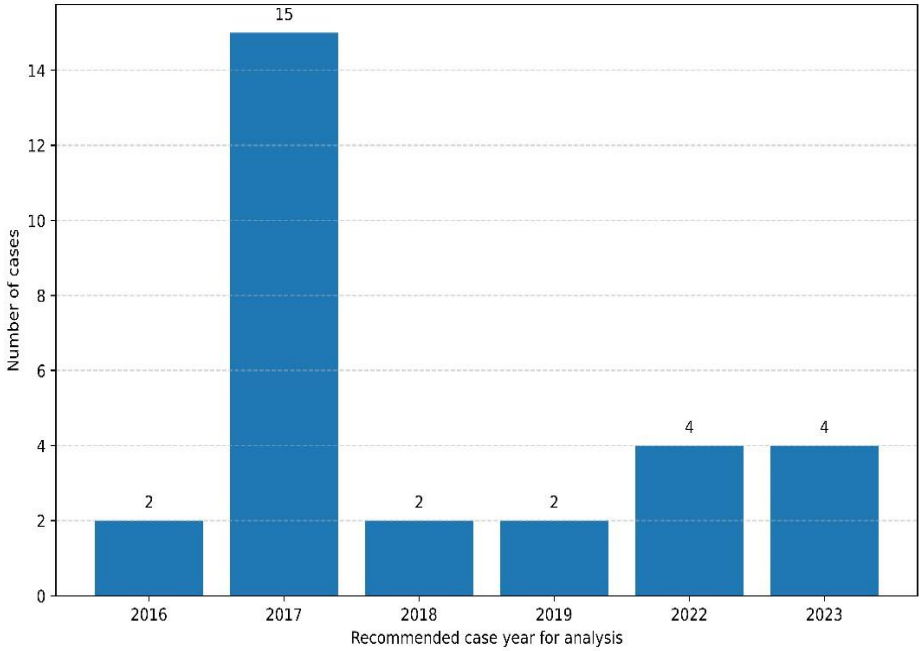

Figure 3. OCR legal corpus: corrected case-year distribution.

4.5 IPEDS Institutional Context and Implications for AI-Supported Accessibility

IPEDS results show that digital and disability-service infrastructure is widely present in higher education. Among active instructional institutions, 98.81% reported a disability-services URL, and 63.04% offered distance-education courses. Among active four-year-or-above institutions, 99.21% reported a disability-services URL, while 89.38% offered distance education. These values do not measure whether the relevant websites or online services are accessible, but they demonstrate the institutional relevance of digital accessibility obligations. Key digital and disability context indicators vary across institutional sectors, as illustrated in

Figure 4, with public four-year institutions showing the highest values for disability-services URL presence, online application URL presence, distance education, and disability-registration above the 3% threshold.

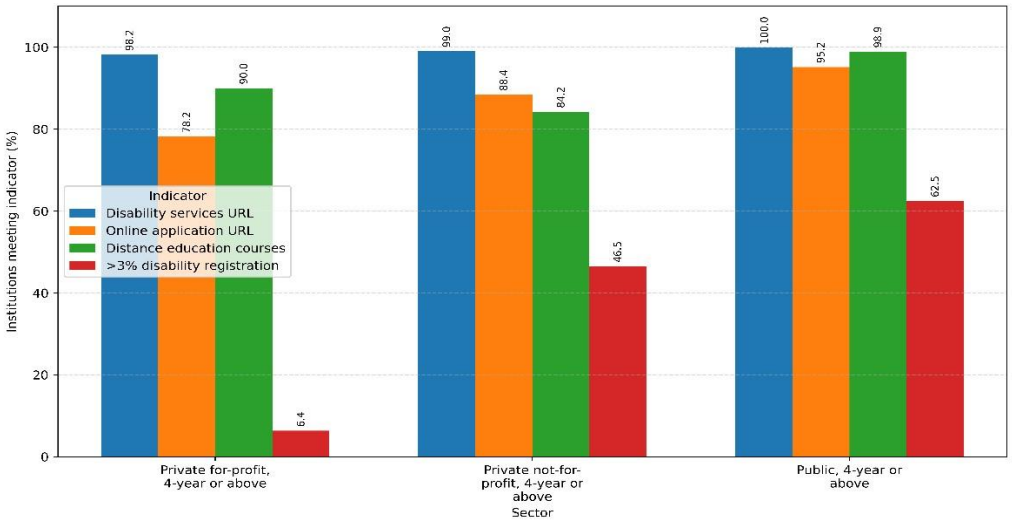

Figure 4. IPEDS: key digital and disability context indicators by active four-year sector.

Taken together, the results support three conclusions. First, DD-WARF findings show widespread technical barriers across university websites, especially in Perceivable and Operable WCAG principles. Second, OCR legal documents show that these barriers become legal risks when institutions fail to address web content, documents, assistive-technology access, captioning, training, monitoring, and remediation. Third, IPEDS confirms that digital services and disability-service infrastructure are central to higher education operations. These combined findings justify the article's later focus on AI-supported remediation, but only under governance conditions that require human validation, accessibility expertise, documentation, and institutional accountability.

4.6 AI-Solution and Governance Framework

Based on the combined DD-WARF, OCR, and IPEDS findings, the study developed a conceptual AI-solution and governance framework linking detected accessibility barriers with legal risks and human-reviewed remediation strategies, as summarized in Table 5. The framework identified AI-supported uses for accessibility triage, contrast and visualaccessibility detection, alt-text drafting, caption and transcript support, PDF and document remediation, LMS scanning, procurement review, and institutional governance dashboards. However, AI should not be treated as a compliance substitute. Each AI-supported function requires human validation, accessibility expertise, documentation, and accountability. The highest-priority governance areas were recurring accessibility audits, document and PDF remediation workflows, institutional accountability, privacy safeguards, and human review of AI-generated accessibility outputs. This finding directly connects the technical and legal evidence to responsible institutional practice.

Table 5. AI-supported accessibility and governance framework

Accessibility/legal problem	AI-supported response	Required safeguard
Contrast and visualaccess barriers	AI-assisted detection and prioritization	WCAG validation and human design review
Missing alt text	AI-generated alt-text drafting	Human review before publication
Captioning barriers	AI captioning and transcription support	Human correction and quality assurance
PDF/document inaccessibility	AI-assisted document remediation triage	Manual tag-tree, reading-order, and form-field validation
Fragmented monitoring	Governance dashboard	Compliance review, audit logs, and accountability
LMS/course barriers	AI-supported LMS scanning	Instructor and accessibility-office review

5. Discussion

The results of this study suggest that digital access is a systemic issue in higher education, not one that can be solved individually. The DD-WARF results reveal that there were many accessibility barriers throughout the sample of websites from the university, with failures in the Perceivable and Operable categories being 91.09% and 88.22% respectively. This is a pattern that many students with disabilities may have when interacting with content, such as navigating and selecting links, understanding structure, and interacting with digital materials. It is also significant that a large proportion of websites were detected as having a high or very high risk group: 31.61% of websites were in the combined high/very high risk categories. The findings suggest that accessibility issues are not just a few isolated technical glitches, but rather persistent issues with institutional web design and content management and quality assurance. Additional evidence of accessibility barriers from the strongest criterion-level results, especially for the areas of contrast, link purpose, and non-text content, also indicates that accessibility barriers impact visual access and assistive-technology use.

These results are consistent with prior literature arguing that accessibility in higher education must be treated as an institutional practice rather than a narrow technical task. Seale (2020) stresses that the culture within organisations, the responsibility of staff and the implementation of policy into practice are vital to making digital practice accessible. The present study corroborates this because the technical findings were confirmed by the OCR legal corpus which showed the presence of web accessibility, document accessibility, WCAG compliance, policy, monitoring and remediation in all 29 cases. The fusion of technical and legal evidence implies that there is a legal risk when accessibility is not part of a long-term governance process. Likewise, the fact that the same categories of OCR cases often related to policy, training and monitoring supports the use of process and policy as a means to manage accessibility, not just the reactive approach of correcting issues after they occur as advocated by Lazar et al. (2015).

The findings also add to existing online accessibility studies and demonstrate the prevalence of barriers in the digital infrastructure of higher education. She and Martin (2022) noted that there are still gaps in the research regarding the accessibility of online resources, including implementation, evaluation and inclusive design. The results of the current study confirm that concern. While 98.81% of active instructional institutions provided URLs for disabilityservices and 63.04% provided distance-education activity, these data do not indicate the quality of accessibility. Rather, they demonstrate that the digital services are a part of the institutional life. This suggests that inaccessible websites, documents, forms, videos or online learning materials can impact on the main functions of an institution and not just peripheral services. Accessibility, then, should be integrated into the web governance, digital procurement, instructional design, document creation and coordinating disability services.

The research also has implications for new solutions based on AI. The findings indicate that AI can be used to triage accessibility issues, check documents, draft captions, assist with alternative text, scan LMS, and provide governance dashboards, all while subject to human review. This is especially relevant given that there are OCR findings related to legal risk in the document accessibility and remediation themes, with DD-WARF findings indicating that there are patterns that can be prioritized by using AI-assisted workflows. The discussion should be about AI and not a compliance solution, however. AI tools like ChatGPT can enhance students' independence and self-management of academic tasks, although they also present challenges related to accuracy, reliance, privacy, and access (Pierrès et al., 2025). That care is captured in the governance framework proposed in this study, which considers AI as an enabling technology that needs to be expertly validated, provided with audit trails, protected with privacy measures, and held accountable by institutional mechanisms.

The implications are straight-forward. There is a need for regular accessibility audits, human validated remediation workflows, accessible document production, training faculty and staff, reviewing procurement, student feedback mechanisms, and defining who does what. The negative correlation between total WCAG failures and Lighthouse accessibility scores also indicates that automated indicators can be used to identify risk patterns – but not in place of screen-reader testing, keyboard testing or user validation. It is important for institutions to be using automated tools or AI systems to identify and prioritize issues, and leaving compliance reviews for trained compliance human beings or accessibility professionals.

There are some limitations recognized. The DD-WARF dataset is based on automated indicators – not on full manual audits. Accessibility issues may not be represented in the OCR corpus, and case distribution may be related to the availability of documents. IPEDS does not measure the quality of accessibility. The AI framework is a theoretical one, and has not been tested in practice. This research should be a foundation for future research, which should incorporate automated and manual testing, incorporate user feedback, evaluate AI tools in practice, and broaden cross-national comparisons.

Conclusion

This study concludes that digital accessibility in higher education remains a persistent institutional challenge rather than a narrow website-design issue, as analysis of the DD-WARF dataset revealed widespread barriers across university websites, particularly within Perceivable and Operable WCAG principles, and the OCR legal corpus demonstrated that web accessibility, document accessibility, WCAG compliance, policy, monitoring, and remediation were present across all 29 cases. Legal-access themes also included screen-reader access and captioning; further, IPEDS data showed that disability-service and digital-infrastructure are critical parts of institutional operations, with almost all four-year institutions having URLs that offer disability services and nearly all having distance education. The implications are both practical and legal: institutions can't simply rely on automated scores or a single technical solution, but need to conduct regular audits, provide easy access to

document workflows, train staff and faculty, implement procurement processes, provide feedback mechanisms for students, and establish clear accountability for remediation; while AI tools can help with triage, caption drafting, alt-text generation, document checking, LMS scanning, and governance dashboards, they should not be used as a substitute for human review and should not be treated as evidence of legal compliance. Future research should consider combining automated testing with manual testing, assistive-technology evaluation, and feedback from students with disabilities; should analyze AI-supported accessibility tools in real institution settings and evaluate their effectiveness, risks, efficiency, and impact on students with disabilities; and should involve direct student feedback from students with disabilities.

REFERENCES

1. AAcosta-Vargas, P. (2026). DD-WARF accessibility dataset (Version 1) [Data set]. Mendeley Data. https://doi.org/10.17632/8p7c7wjb5v.1
2. Ayala, S. (2023). ChatGPT as a Universal Design for Learning Tool Supporting College Students with Disabilities. Educational Renaissance, 12, 22-41.
3. Bengtsson, L., & Hammarberg, J. (2025). Web Content Accessibility Guidelines (WCAG) within a Company.
4. Bong, W. K., & Chen, W. (2024). Increasing faculty's competence in digital accessibility for inclusive education: a systematic literature review. International Journal of Inclusive Education, 28(2), 197-213.
5. Chan, V. K., & Lei, H. M. (2023, August). Legal Risks of E-Learning: A case study of the small jurisdiction Macao versus some major jurisdictions. In Proceedings of the 7th International Conference on Education and Multimedia Technology (pp. 310-314).
6. Ferri, D., & Subic, N. (2023). The European Union: Federal trends in disability rights. D. Ferri, F. Palermo, G. Martinico, Federalism and the Rights of Persons with Disabilities. Oxford: Hart Publishing (2023) https://www. bloomsbury. com/uk/federalism-and-the-rights-of-persons-with-disabilities-97815099624.
7. Holmes, W., & Miao, F. (2023). Guidance for generative AI in education and research. Unesco Publishing.
8. Knight, V., Gittens, C., & Gittens, M. (2024). Inclusion in education: A philosophical framework. The Bloomsbury Handbook of Caribbean and African Studies in Education.
9. Kotera, Y., Chircop, J., Hutchinson, L., Rhodes, C., Green, P., Jones, R. M., ... & Garip, G. (2021). Loneliness in online students with disabilities: Qualitative investigation for experience, understanding and solutions. International journal of educational technology in higher education, 18(1), 64.
10. Lazar, J. (2022). Managing digital accessibility at universities during the COVID-19 pandemic. Universal Access in the Information Society, 21(3), 749-765.
11. Lazar, J., Goldstein, D. F., & Taylor, A. (2015). Ensuring digital accessibility through process and policy. Morgan kaufmann.
12. Lomellini, A., Lowenthal, P. R., Snelson, C., & Trespalacios, J. H. (2025). Accessible and inclusive online learning in higher education: A review of the literature. Journal of Computing in Higher Education, 37(3), 1306-1329.
13. Mullins, L. E., & Mitchell, J. (2022). The Transition Online: A Mixed-Methods Study of the Impact of COVID-19 on Students with Disabilities in Higher Education. International Journal of Higher Education, 11(2), 13-29.
14. National Center for Education Statistics. (2026). IPEDS 2024–25 provisional data files [Data set]. U.S. Department of Education, Institute of Education Sciences. https://nces.ed.gov/ipeds/tablefiles/zipfiles/IPEDS_2024-25_Provisional.zip
15. Pierrès, O., Darvishy, A., & Christen, M. (2025). Exploring the role of generative AI in higher education: Semi-structured interviews with students with disabilities. Education and Information Technologies, 30(7), 8923-8952.
16. Rice, M. F., & Dunn, S. (2023). The use of artificial intelligence with students with identified disabilities: A systematic review with critique. Computers in the Schools, 40(4), 370-390.
17. Römhild, A., & Holllederer, A. (2024). Effects of disability-related services, accommodations, and integration on academic success of students with disabilities in higher education. A scoping review. European Journal of Special Needs Education, 39(1), 143-166.
18. Seale, J. (2020). Improving accessible digital practices in higher education. Palgrave Macmillan. DOI, 10, 978-3.
19. Senjam, S. S., & Manna, S. (2024). Assistive technology and disabilities in the context of sustainable developmental goals. In The Palgrave encyclopedia of disability (pp. 112). Cham: Springer Nature Switzerland.
20. She, L., & Martin, F. (2022). Systematic review (2000 to 2021) of online accessibility research in higher education. American Journal of Distance Education, 36(4), 327-346.
21. U.S. Department of Education, Office for Civil Rights. (2026). OCR advanced search. https://ocrcas.ed.gov/ocr-advanced-search
22. Verma, S., Kaushik, P., & Sharma, G. (2025). AI IN EDUCATION: OPPORTUNITIES, CHALLENGES, AND ETHICAL DILEMMAS. Journal (IERJ), 11(11), 329-340.
23. Voultsiou, E., & Moussiades, L. (2025). A systematic review of AI, VR, and LLM applications in special education: Opportunities, challenges, and future directions. Education and Information Technologies, 30(13), 19141-19181.
24. Yang, H. P. (2025). MASEM dataset on educational AI technology adoption among students (from 2020 to May 2025) (Version 1) [Data set]. Mendeley Data. https://doi.org/10.17632/t8ns6fdky2.1
25. Zhao, X., Cox, A., & Chen, X. (2025). The use of generative AI by students with disabilities in higher education. The Internet and Higher Education, 66, 101014.