

Accessibility and Usability Evaluation of E-Governance Portals: Identifying Gaps for Inclusive Design

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Abstract- The rapid expansion of India's digital governance ecosystem under the Digital India initiative has positioned e-governance portals as critical platforms for delivering public services. However, the effectiveness of these platforms depends not only on service availability but also on ensuring accessibility, usability, and reliable performance. This study evaluates selected Indian e-governance portals to identify gaps affecting inclusive digital access. A mixed-method approach was adopted, combining automated accessibility testing based on WCAG 2.1 Level AA standards with a user perception survey conducted among 44 participants. The findings reveal a significant "Accessibility–Usability Gap." Although most respondents were digitally proficient young adults, only 13.6% reported being very satisfied with their overall experience. Approximately 50% identified technical glitches and poor system performance as primary barriers, while 45.5% reported inadequate mobile compatibility. Furthermore, 27.3% indicated that accessibility support features, such as screen reader compatibility, were insufficient. The study concludes that digital accessibility must extend beyond technical compliance to incorporate mobile-first design principles, improved system performance, and user-centered interface development. Implementing these improvements can foster a more inclusive, efficient, and equitable digital governance framework in India.

Keywords – E-Governance, WCAG 2.1, Inclusive Design, User Experience, Digital Accessibility, Mobile-First Design, System Performance.

I. INTRODUCTION

The digital transformation of governance in India has transitioned from informational portals to transactional ecosystems supporting tax filing, railway reservations, welfare scheme registration, and identity services such as Aadhar and PAN. While the Digital India initiative has expanded access to digital services, inconsistencies in usability and accessibility undermine inclusive participation.

Inclusive governance requires adherence to Universal Design principles, ensuring accessibility for elderly citizens, individuals with disabilities, rural populations dependent on low-bandwidth networks, and users operating on low-end mobile devices.

This study introduces the concept of a "Usability Divide"—a condition in which digital services exist but remain practically inaccessible due to poor performance, weak UX design, and insufficient mobile responsiveness.

Research Questions:

- To what extent do Indian e-governance portals comply with WCAG 2.1 standards?
- How do digitally literate users perceive portal usability?
- What structural gaps hinder inclusive participation?

II. LITERATURE REVIEW

Digital equality is closely linked to inclusive platform architecture [1]. While policy frameworks promote accessibility, implementation often remains superficial [2]. Research indicates that usability directly influences institutional credibility [3].

Droutsas et al. highlight that compliance with accessibility standards does not guarantee smooth user experience [5]. Nguyen et al. emphasize the importance of "Easy-to-Read" content alongside technical accessibility [11].

This study builds upon existing frameworks by integrating technical compliance testing with empirical user perception data specific to Indian e-governance portals.

III. RESEARCH METHODOLOGY

A mixed-method approach was adopted combining auto- mated technical audits and survey-based usability evaluation



Fig. 1. Mixed-Method Research Framework

A. Automated Accessibility Testing

Selected portals were evaluated using WAVE and A Checker tools for WCAG 2.1 Level AA compliance, assessing:

- Color contrast ratios
- Alternative text availability
- ARIA labeling
- Keyboard navigability
- Form field accessibility

B. User Perception Survey

A structured 22-question survey was conducted with 44 participants. The demographic was intentionally composed of digitally literate young adults to test the Expert Barrier Hypothesis.

C. Qualitative Analysis

Open-ended responses were analyzed across:

- IRCTC
- MSRTC
- DigiLocker
- Income Tax Portal

B. Usage Trends

- 47.7% primarily used portals for bill payments/tax filing
- 29.5% accessed document-related services
- 38.6% reported rare usage

C. Usability and Navigation

- Only 11.4% found navigation “Very Easy”
- 50% rated navigation neutral
- 11.4% strongly agreed layouts were user-friendly

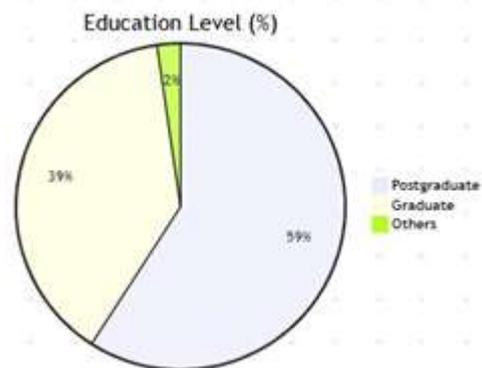


Fig. 3. Education Level

D. Mobile Compatibility

- 45.5% reported poor mobile performance
- 25% experienced seamless multi-device compatibility

E. Accessibility Support

- 27.3% reported absence of assistive technology support
- 22.7% rated visual elements highly suitable

F. Satisfaction and Barriers

- Only 13.6% were “Very Satisfied”
- 50% cited technical glitches as the primary barrier
- 43.2% demanded faster loading speeds

IV. RESULTS AND ANALYSIS

A. Participant Demographics

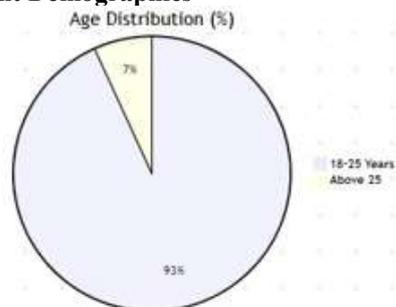


Fig. 2. Age Distribution

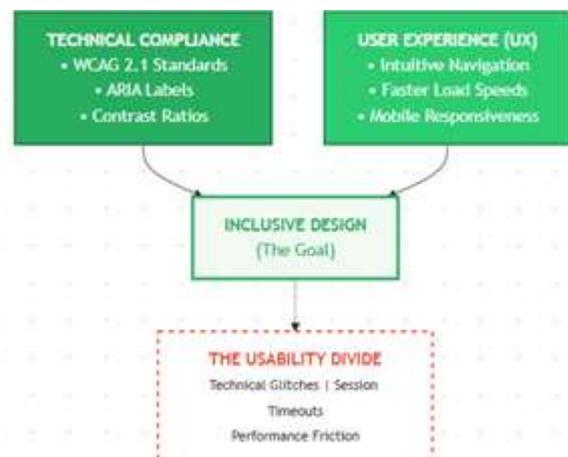


Fig. 4. Accessibility–Usability Gap (Conceptual Model)

V. QUALITATIVE CASE ANALYSIS

Recurring portal-specific issues include:

- IRCTC: Session timeouts and peak-hour server lag
- MSRTC: Non-responsive booking interfaces on mobile
- Income Tax Portal: Delays during login and submission
- DigiLocker: Incompatibility with legacy devices

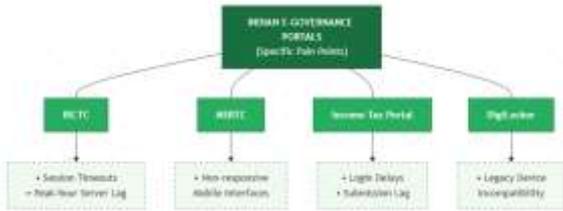


Fig. 5. Portal-Specific Qualitative Pain Points

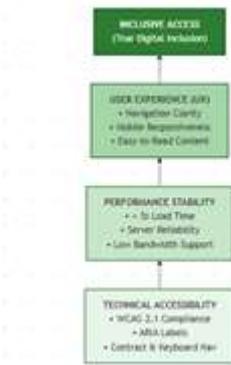


Fig. 6. Layered model illustrating that technical compliance forms the foundation, but performance and UX are essential for achieving true inclusive digital access.

VI. DISCUSSION

The results indicate a Legacy Desktop Bias in portal architecture. Performance inefficiencies function as indirect accessibility barriers, disproportionately affecting rural and economically weaker populations.

Accessibility must be redefined as a holistic integration of performance, usability, and assistive compatibility rather than checklist compliance.

Table I
Participant Demographics (N = 44)

Parameter	Category	Percentage (%)
Age Group	18–25 years	93.2
	Above 25 years	6.8
Education Level	Postgraduate	59.1
	Graduate	38.6
	Others	2.3

Table II
Usage Pattern of E-Governance Portals

Parameter	Category	Percentage (%)
Most Used Services	Bill Payment / Tax Filing	47.7
	Document Services	29.5
	Other Services	22.8
Frequency of Use	Daily	9.1
	Rarely	38.6
	Occasionally	52.3

Table III
Usability And Accessibility Evaluation

Evaluation Parameter	Key Finding	Percentage (%)
Navigation “Very Easy”	Positive response	11.4
Layout “Strongly User-Friendly”	Positive response	11.4
Mobile Fully Optimized	Positive response	25.0
Poor Mobile Compatibility	Negative response	45.5
No Accessibility Support	Negative response	27.3
“Very Satisfied” Overall	Positive response	13.6
Technical Glitches as Main Barrier	Reported Issue	50.0
Demand Faster Loading Speed	Improvement Area	43.2

VII. CONCLUSION AND FUTURE SCOPE

This study confirms the presence of an Accessibility–Usability Gap in Indian e-governance portals. Technical instability and mobile incompatibility remain major barriers.

Recommendations

- Mandatory mobile-first optimization
- Performance benchmarking (≤ 3 seconds load time)
- Pre-launch accessibility audits involving elderly and disabled users
- Easy-to-read content implementation

Future Scope

- AI-driven regional voice navigation
- Adaptive UI personalization
- Continuous accessibility compliance monitoring

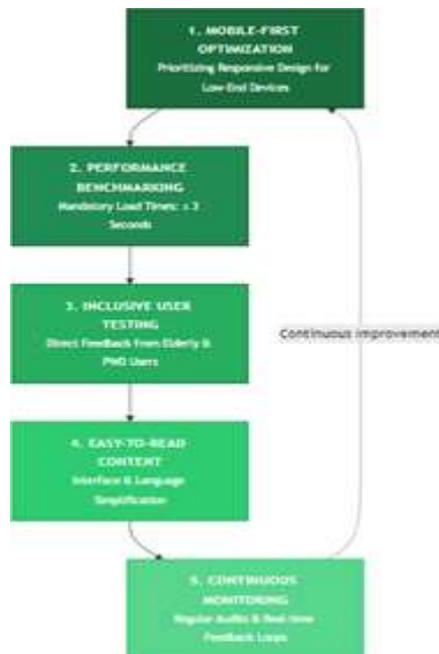


Fig. 7. Proposed Inclusive Design Framework

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