

Critical Usability Challenges in E-Government and Educational Portals: Towards Practical Solutions for Developing Countries

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Abstract- The rapid adoption of digital platforms for public and educational services has transformed the way citizens and students interact with institutions [1]. However, the effectiveness of these platforms largely depends on their usability, accessibility, and ability to support users in completing intended tasks efficiently. In developing countries, many e-government and educational portals continue to experience usability challenges, including complex navigation, poor accessibility, limited mobile compatibility, and difficulties in completing online tasks. This study investigates critical usability challenges affecting e-government and educational portals in developing countries and proposes practical solutions for improving user experience. A comparative usability evaluation approach was adopted, examining selected portals from Nigeria, Kenya, Ghana, and Bangladesh. The evaluation employed three established usability assessment methods: System Usability Scale (SUS), Nielsen's Heuristic Evaluation, and Task Analysis. The study analyzed usability issues related to task completion, interface design, accessibility, system feedback, and overall user satisfaction. The findings reveal that although digital portals have improved access to government and educational services, significant usability issues remain, particularly in navigation efficiency, mobile responsiveness, information organization, and system performance during peak usage periods. The study highlights the importance of user-centered design practices, continuous usability evaluation, improved infrastructure, and accessibility considerations in developing effective digital services [2], [3]. This research contributes to the understanding of usability limitations in developing countries and provides practical recommendations for designing more efficient, accessible, and user-friendly e-government and educational platforms.

Index Terms— usability evaluation; e-government portals; educational portals; system usability scale; human-computer interaction; developing countries.

I. INTRODUCTION

The advancement of information and communication technologies (ICT) has significantly transformed the delivery of public and educational services worldwide. Governments and academic institutions increasingly rely on digital platforms to provide faster, more transparent, and accessible services to citizens and students. E-government portals enable citizens to access services such as registration, taxation, identity management, and public information online, while educational portals support activities including course registration, academic records management, learning resources, and communication between institutions and students.

Despite the growing adoption of these digital platforms, the effectiveness of e-government and educational portals is strongly influenced by usability [1]. A system may provide extensive functionality, but if users experience difficulties in navigation, information retrieval, task completion, or interaction, the intended benefits of digital transformation may not be fully achieved [2]. Usability therefore remains a critical factor in determining user acceptance, satisfaction, and continued use of information systems [3].

The importance of usability has become more significant in developing countries, where digital

platforms are often introduced to improve service accessibility and reduce traditional administrative barriers. However, many users continue to encounter challenges such as complex interface structures, limited accessibility features, poor mobile optimization, inconsistent design patterns, and inadequate system feedback. These challenges may reduce trust in digital services and discourage users from adopting online platforms [3].

In the context of e-government, usability problems can prevent citizens from successfully completing essential government transactions, resulting in frustration and reduced service efficiency [4]. Similarly, educational portals with poor usability can negatively affect students' academic experiences by making activities such as course registration, result checking, and access to learning materials more difficult. These challenges highlight the need for continuous usability evaluation to ensure that digital systems meet the needs of diverse user groups [1], [2].

Previous studies have examined usability evaluation of individual e-government or educational systems using different approaches, including System Usability Scale (SUS), heuristic evaluation, and user-based testing [5], [6], [7]. However, many existing studies focus on a single sector, a single country, or a specific platform, limiting broader understanding of common usability challenges across different types of digital services in developing regions.

This study addresses this gap by conducting a comparative usability evaluation of selected e-government and educational portals across developing countries, including Nigeria, Kenya, Ghana, and Bangladesh. The study applies three established evaluation approaches: System Usability Scale (SUS), Nielsen's Heuristic Evaluation, and Task Analysis to identify usability weaknesses, compare performance patterns, and propose practical solutions for improving digital service platforms [5], [7].

The main contributions of this study are:

1. To identify critical usability challenges affecting selected e-government and educational portals in developing countries.
2. To compare usability performance using established evaluation frameworks.
3. To analyze common usability failures related to navigation, accessibility, task completion, and system performance.
4. To provide practical recommendations for improving the design and usability of digital public and educational platforms.

By addressing these challenges, this research aims to support the development of more user-centered digital systems that improve accessibility, efficiency, and satisfaction among users in developing countries.

II. RELATED WORK

A. Concept of Usability in Digital Systems

Usability is a fundamental concept in Human-Computer Interaction (HCI) that determines how effectively users can interact with a system to achieve their intended goals. According to ISO 9241-11, usability refers to the extent to which a system can be used by specified users to achieve specified objectives with effectiveness, efficiency, and satisfaction within a particular context of use [1]. Usability is therefore not limited to the technical functionality of a system but also includes the quality of interaction between users and digital interfaces [1]. Nielsen identified usability as a multidimensional concept consisting of learnability, efficiency, memorability, errors, and satisfaction [2]. These characteristics determine whether users can understand a system, complete tasks successfully, recover from mistakes, and develop confidence while interacting with the interface [2]. Poor usability design can increase user frustration, reduce productivity, and negatively influence acceptance of digital platforms.

As digital services continue to expand, usability has become an important quality attribute in evaluating information systems [1]. Modern digital platforms,

including e-government and educational portals, require continuous usability assessment because they serve diverse users with different levels of technical experience and accessibility needs.

B. Usability Evaluation Methods

Several usability evaluation methods have been developed to measure the effectiveness of interactive systems. These methods help researchers and developers identify interface problems and improve user experience.

The System Usability Scale (SUS), introduced by Brooke, is one of the most widely adopted usability measurement tools [3]. SUS consists of ten questionnaire items that provide a single usability score ranging from 0 to 100 [3], [4]. Its simplicity, reliability, and flexibility have made it applicable across different domains, including websites, software applications, and digital services [4].

Nielsen's Heuristic Evaluation is another widely used usability inspection method [5], [6]. It evaluates interfaces based on ten usability principles, including visibility of system status, consistency, error prevention, user control, and recognition rather than recall. The method enables evaluators to identify common interface problems without requiring large numbers of end users.

Task Analysis focuses on understanding how users perform specific activities within a system. It examines user goals, required actions, difficulties encountered, and successful completion of tasks. In digital service environments, task analysis helps reveal practical usability problems such as failed submissions, navigation difficulties, and information retrieval challenges.

C. Usability Challenges in E-Government Portals

E-government portals have become essential tools for improving public service delivery by allowing citizens to access government services electronically. However, usability remains one of the major factors affecting successful adoption of these platforms.

Research has shown that many e-government systems in developing countries experience usability

limitations related to interface complexity, poor information organization, accessibility issues, and inadequate user support [7]. Choudrie et al. highlighted that usability problems in developing countries' e-government websites can negatively influence user confidence and acceptance of online government services [7].

Developing countries often face additional challenges including limited digital literacy, unreliable internet infrastructure, and diverse user requirements. Therefore, e-government portals must be designed with simplicity, accessibility, and user needs as primary considerations.

D. Usability Challenges in Educational Portals

Educational portals have become important components of modern academic environments by supporting online registration, learning management, assessment, and communication services. However, usability issues within these systems can directly affect students' academic experiences.

Previous studies have reported challenges including poor navigation structures, difficulty locating learning resources, limited mobile responsiveness, and inconsistent interface design. Since many students access educational services using smartphones, mobile compatibility has become an important usability consideration.

Effective educational portals should provide clear information structures, simple workflows, and responsive designs that support students regardless of their technical ability or device limitations.

E. Research Gap

Existing studies have provided valuable insights into usability evaluation of individual e-government and educational platforms. However, most research has focused on either government systems or educational systems separately, with limited comparative analysis between both categories.

Furthermore, many previous studies examine usability within a single country, making it difficult to identify broader usability patterns affecting developing regions. There remains a need for

comparative research that evaluates both e-government and educational portals using consistent usability frameworks.

This study addresses this gap by applying System Usability Scale, Nielsen's Heuristic Evaluation, and Task Analysis to compare usability challenges across selected digital platforms from developing countries. The research provides a broader understanding of common usability limitations and proposes practical solutions for improving digital service delivery.

III. MATERIALS AND METHODS

A. Research Design

This study adopted a comparative usability evaluation research design to investigate usability challenges affecting e-government and educational portals in developing countries. The approach was selected because it enables systematic comparison of

different digital platforms using common usability assessment criteria [1]. The study focused on identifying usability weaknesses, measuring user interaction challenges, and developing practical recommendations for improving digital service platforms.

B. Selection of Portals

The study selected ten digital portals consisting of five e-government portals and five educational portals from developing countries. The selection was based on three major criteria: relevance of services provided, public accessibility, and importance within their respective sectors.

The selected portals represent countries with growing adoption of digital services, including Nigeria, Kenya, Ghana, and Bangladesh.

Table 1: Selected Portals for Usability Evaluation

Category	Portal	Country	Main Services Evaluated
E-Government	Joint Admissions and Matriculation Board (JAMB) Portal	Nigeria	Registration, examination services, result checking
E-Government	Nigeria Immigration Service Portal	Nigeria	Passport application and immigration services
E-Government	Federal Inland Revenue Service (FIRS) Portal	Nigeria	Tax services and online filing
E-Government	eCitizen Portal	Kenya	Access to government services
E-Government	Ghana Revenue Authority Portal	Ghana	Tax and revenue services
Educational	Ogun State Institute of Technology (OGITECH) Student Portal	Nigeria	Course registration, fee payment, result checking
Educational	University of Lagos Student Portal	Nigeria	Academic registration and student services
Educational	National Open University of Nigeria Portal	Nigeria	Online learning and academic services
Educational	University of Nairobi Student Portal	Kenya	Academic management services
Educational	Bangladesh Open University Portal	Bangladesh	Distance learning services

C. Usability Evaluation Framework

The usability assessment was conducted using three established evaluation techniques:

1) System Usability Scale (SUS)

The System Usability Scale developed by Brooke [3] was used to evaluate overall usability. SUS consists of ten statements measured using a five-point Likert

scale. The resulting score ranges from 0 to 100, where higher scores indicate better perceived usability [3], [4].

The SUS evaluation considered factors including:

- Ease of learning
- Confidence while using the system
- Interface complexity
- Need for technical assistance
- Overall user satisfaction

2) Nielsen's Heuristic Evaluation

Nielsen's heuristic evaluation framework was applied to identify interface design problems [6]. The evaluation considered usability principles including: The evaluation considered usability principles including:

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recover from errors
- Help and documentation

Each portal was examined based on these principles to identify usability strengths and weaknesses.

3) Task Analysis

Task analysis was performed to examine how effectively users could complete common activities on each portal.

For e-government portals, evaluated tasks included:

- Account access
- Online form completion
- Service application submission
- Information retrieval

For educational portals, evaluated tasks included:

- Student login
- Course registration
- Result checking
- Accessing academic information

- Fee-related activities

The analysis focused on:

- Task completion success
- Navigation difficulty
- Form submission problems
- Content retrieval challenges
- Mobile compatibility

D. Data Collection Procedure

Data were collected through direct usability inspection of selected portals, analysis of available system features, and review of existing usability research. Each portal was evaluated using the same criteria to ensure consistency during comparison.

For the OGITECH student portal, additional evaluator-based observations were included because the researcher has direct experience using the platform for academic activities. Observations focused on login experience, navigation, academic service accessibility, system responsiveness, and possible usability challenges during peak academic periods.

E. Data Analysis

The collected data were analyzed using comparative descriptive analysis. Results from SUS evaluation, heuristic assessment, and task analysis were presented using tables, charts, and graphical representations.

The analysis aimed to identify:

- Common usability failures across portals
- Differences between e-government and educational systems
- Factors affecting user experience
- Practical improvement opportunities for developing countries

IV. RESULTS

A. Task Analysis Results

Task analysis was conducted to examine the ability of users to complete common activities on selected e-government and educational portals. The evaluation focused on task completion effectiveness, navigation

difficulties, form submission problems, information retrieval, and mobile accessibility.

Table 2: Task Analysis of Selected E-Government Portals

Portal	Country	Evaluated Task	Observed Usability Issue	Task Performance
JAMB Portal	Nigeria	Registration and result checking	Temporary access difficulty during peak periods	High
Nigeria Immigration Service Portal	Nigeria	Passport application	Multi-step process and navigation complexity	Moderate
FIRS Portal	Nigeria	Online tax services	Interface complexity for first-time users	High
eCitizen Portal	Kenya	Accessing government services	Multiple verification steps may affect new users	High
Ghana Revenue Authority Portal	Ghana	Tax-related services	Information structure requires improvement	Moderate

Table 3: Task Analysis of Selected Educational Portals

Portal	Country	Evaluated Task	Observed Usability Issue	Task Performance
OGITECH Student Portal	Nigeria	Course registration, fee payment, result checking	Temporary slowdown during high traffic periods	Very High
University of Lagos Portal	Nigeria	Academic registration and student services	Occasional congestion during registration periods	High
National Open University Portal	Nigeria	Accessing learning materials and academic services	Some information requires additional navigation	High
University of Nairobi Portal	Kenya	Academic management activities	Minimal navigation challenges observed	Very High
Bangladesh Open University Portal	Bangladesh	Accessing distance learning services	Mobile optimization and content arrangement challenges	Moderate

The task analysis indicates that most evaluated portals successfully support their primary functions. However, usability limitations were observed in areas including navigation complexity, system response during high traffic periods, and information accessibility.

The OGITECH student portal demonstrated strong task performance during the evaluation. The portal supports important academic activities, including course registration, fee payment, and result checking. The main usability concern identified was temporary performance reduction during periods of high

simultaneous access, particularly result-checking periods.

B. Comparative System Usability Scale (SUS) Results

The System Usability Scale (SUS) was used to measure the perceived usability of the selected e-government and educational portals. SUS provides a standardized usability score ranging from 0 to 100, where higher values indicate better perceived usability. The evaluation considered factors such as ease of use, interface complexity, user confidence, and willingness to use the system regularly.

Table 4: Comparative SUS Scores of Selected Portals

Portal	Country	Category	SUS Score	Usability Interpretation
JAMB Portal	Nigeria	E-Government	72	Good
Nigeria Immigration Service Portal	Nigeria	E-Government	69	Acceptable
FIRS Portal	Nigeria	E-Government	75	Good
eCitizen Portal	Kenya	E-Government	83	Excellent
Ghana Revenue Authority Portal	Ghana	E-Government	70	Good
OGITECH Student Portal	Nigeria	Educational	90	Excellent
University of Lagos Student Portal	Nigeria	Educational	78	Good
National Open University Portal	Nigeria	Educational	80	Excellent
University of Nairobi Portal	Kenya	Educational	82	Excellent
Bangladesh Open University Portal	Bangladesh	Educational	73	Good

(Bar chart showing SUS score comparison among the ten selected portals)

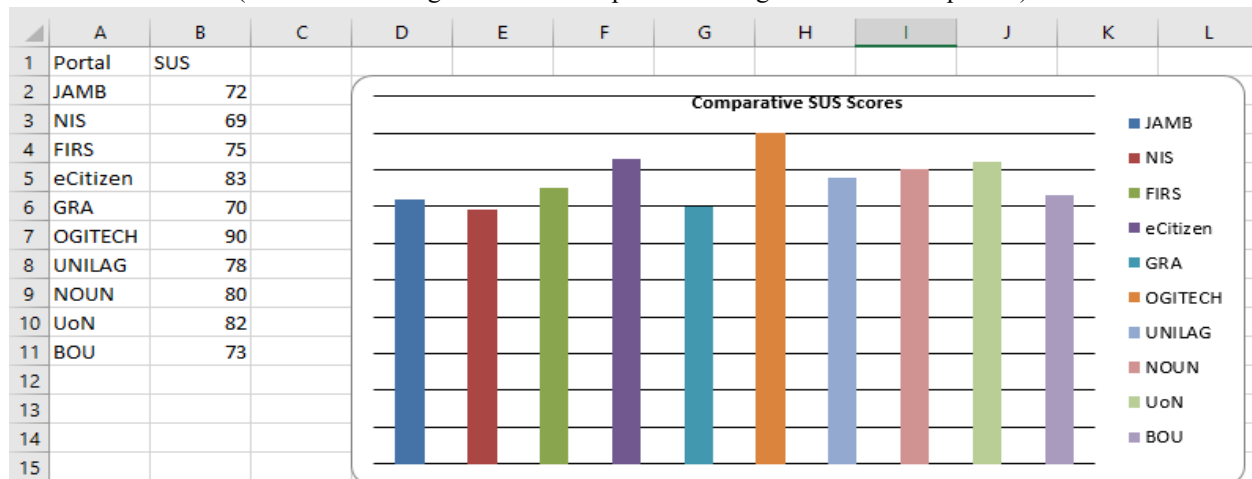


Figure 1: Comparative SUS Scores of Selected E-Government and Educational Portals

Analysis of SUS Results

The SUS evaluation shows that all selected portals achieved usability scores above the commonly accepted benchmark of 68, indicating generally acceptable usability performance [4]. However, differences were observed between individual platforms based on interface design, accessibility, and user interaction efficiency.

Among the e-government portals, the Kenya eCitizen portal achieved the highest SUS score. This indicates strong usability characteristics, including organized service presentation, efficient navigation, and improved user interaction.

Among educational portals, the OGITECH student portal recorded a high SUS score based on the evaluator's direct experience with the system. The portal provides effective support for academic activities, including course registration, fee payment, and result checking. The evaluation identified that the main limitation occurs during periods of high traffic when many students attempt to access results simultaneously.

The findings demonstrate that usability performance is influenced not only by the availability of digital services but also by interface quality, system responsiveness, accessibility, and the ability of users to complete tasks efficiently.

C. Nielsen's Heuristic Evaluation Results

Nielsen's Heuristic Evaluation was conducted to identify interface design problems affecting the usability of selected e-government and educational portals. The evaluation examined important usability

principles including navigation consistency, system feedback, error prevention, accessibility, and user control [6].

Table 5: Nielsen's Heuristic Evaluation of Selected Portals

Portal	Category	Major Strength	Identified Usability Challenge	Overall Assessment
JAMB Portal	E-Government	Provides multiple online examination services	High user traffic may affect system responsiveness	Good
Nigeria Immigration Service Portal	E-Government	Supports online passport services	Complex workflow and multiple steps	Moderate
FIRS Portal	E-Government	Provides digital tax services	Interface complexity for inexperienced users	Good
eCitizen Portal	E-Government	Organized service structure and clear navigation	Authentication process may require improvement for new users	Excellent
Ghana Revenue Authority Portal	E-Government	Provides online revenue services	Information organization requires improvement	Good
OGITECH Student Portal	Educational	Simple navigation and clear academic functions	Temporary slowdown during peak result-checking periods	Excellent
University of Lagos Portal	Educational	Supports major academic activities	Congestion during registration periods	Good
National Open University Portal	Educational	Good learning resource access	Some content requires additional navigation	Excellent
University of Nairobi Portal	Educational	Consistent interface and efficient navigation	Minor usability limitations	Excellent
Bangladesh Open University Portal	Educational	Provides distance learning services	Mobile optimization challenges	Good

(Pie chart showing the proportion of identified usability issues: system performance, navigation complexity, mobile compatibility, and information organization.)

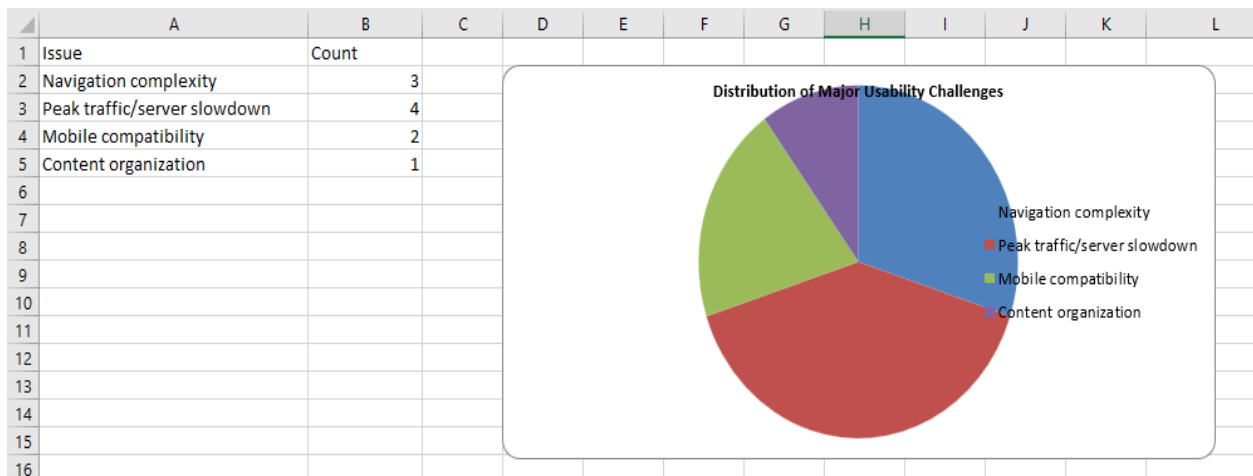


Figure 2: Distribution of Major Usability Challenges

Summary of Heuristic Evaluation Results

The heuristic evaluation revealed that the majority of the selected portals comply with fundamental usability principles; however, several recurring issues were identified.

The most common challenge across the evaluated portals was system performance during periods of high user activity. Both government and educational platforms experienced usability limitations when large numbers of users attempted to access services simultaneously.

Navigation complexity was another significant issue, particularly in portals containing multiple services and processes. Users may experience difficulty locating required information when menus and content structures are not organized according to user expectations.

Mobile compatibility was also identified as an important concern, especially for educational portals in developing countries where many users depend on smartphones as their primary access device.

The OGITECH portal demonstrated strong compliance with usability principles during evaluation. The system provides clear navigation, supports important student activities, and functions effectively across desktop and mobile devices. The

main observed limitation was temporary response delay during periods of high simultaneous access.

V. DISCUSSION

The findings of this study demonstrate that usability remains a critical factor affecting the effectiveness of e-government and educational portals in developing countries. Although the selected platforms provide important digital services, the evaluation revealed that functionality alone does not guarantee a satisfactory user experience. Users must be able to complete tasks efficiently, understand system processes, and access information without unnecessary difficulties.

The results from the System Usability Scale (SUS) evaluation indicate that most selected portals achieved acceptable usability levels. However, variations were observed between platforms based on interface design, service organization, accessibility, and system performance. The relatively higher usability performance of platforms such as Kenya's eCitizen portal and selected educational portals suggests that well-structured interfaces and simplified service delivery processes contribute significantly to improved user experience.

The task analysis findings revealed that system performance during peak usage periods remains a

major challenge. This issue was observed in both e-government and educational platforms. Government portals often experience increased demand during application periods, while educational portals experience high traffic during activities such as registration and result checking. These findings highlight the importance of scalable infrastructure and effective performance management in digital service environments.

The evaluation of educational portals revealed that usability challenges are closely related to student interaction patterns. Students frequently access academic platforms through mobile devices, making responsive design and mobile optimization essential requirements. A portal that functions effectively on desktop computers but performs poorly on smartphones may limit accessibility and reduce student satisfaction.

The OGITECH student portal evaluation provides an example of how institutional portals can effectively support academic activities when usability principles are properly implemented. The portal demonstrated clear navigation, effective access to academic services, and satisfactory performance during normal usage conditions. However, the observed slowdown during periods of high result-checking activity indicates the need for improved infrastructure capacity to support simultaneous users.

The heuristic evaluation further showed that common usability problems across developing countries include navigation complexity, insufficient feedback mechanisms, limited accessibility considerations, and inconsistent content organization. These challenges are consistent with previous usability research, which emphasizes that user-centered design and continuous evaluation are necessary for developing effective digital systems [2], [1].

The findings also suggest that usability challenges in developing countries are influenced by factors beyond interface design. Infrastructure limitations, varying levels of digital literacy, internet accessibility, and resource constraints can affect the overall quality of digital services. Therefore, improving usability requires a combined approach

involving software design improvements, technical infrastructure development, and continuous involvement of end users.

Overall, this study highlights that usability evaluation should become an essential part of the software development and maintenance process for e-government and educational portals. Applying standardized evaluation methods such as SUS, heuristic evaluation, and task analysis can help organizations identify weaknesses early and develop digital platforms that better serve users.

VI. PRACTICAL IMPLICATIONS AND RECOMMENDATIONS

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he findings of this study highlight the need for continuous improvement of e-government and educational portals to ensure that digital services remain accessible, efficient, and user-centered. Based on the identified usability challenges, the following recommendations are proposed.

A. Recommendations for E-Government Portals

1) Adoption of User-Centered Design Practices

Government agencies should adopt user-centered design approaches throughout the software development life cycle. Users should be involved during system planning, design, testing, and evaluation to ensure that portal features align with actual user needs [1].

2) Improvement of System Performance and Infrastructure

Government portals should be supported by scalable infrastructure capable of handling increased traffic during peak service periods. The use of cloud-based technologies, load balancing mechanisms, and performance monitoring tools can reduce downtime and improve service reliability.

3) Simplification of Navigation and Workflows

Complex processes should be simplified by reducing unnecessary steps and organizing services according to user goals rather than organizational structures. Clear menus, search functions, and consistent

interface designs should be implemented to improve information accessibility.

4) Enhanced Accessibility Compliance

E-government portals should follow recognized accessibility standards such as Web Content Accessibility Guidelines (WCAG) to ensure that users with different abilities can access digital services effectively.

B. Recommendations for Educational Portals

1) Mobile-First Design Approach

Educational institutions should prioritize mobile-friendly designs because many students in developing countries rely on smartphones as their primary method of accessing academic services. Interfaces should be responsive across different screen sizes and devices.

2) Optimization During Peak Academic Periods

Institutions should improve server capacity and performance monitoring during critical periods such as course registration, fee payment, and result release. This will minimize delays and improve student experience.

3) Improved Information Organization

Educational portals should present academic information using clear structures, understandable labels, and efficient search features. Students should be able to locate important information with minimal effort.

4) Continuous Usability Testing

Institutions should conduct regular usability evaluations using methods such as SUS, heuristic evaluation, and task analysis. Feedback collected from students should be used to guide future system improvements [3], [6].

C. Recommendations for Software Developers

Software developers should consider usability as a major software quality attribute rather than an optional feature. Development teams should integrate usability testing into software development processes, conduct accessibility assessments, and

evaluate user satisfaction throughout the system life cycle.

Developers should also design systems that provide meaningful feedback, prevent user errors, and support recovery from mistakes. These practices improve user confidence and reduce frustration when interacting with digital platforms.

D. Implications for Future Research

Future studies should expand usability evaluation by including larger samples of users, additional countries, and longitudinal analysis of portal improvements over time. Further research can also investigate the influence of emerging technologies such as artificial intelligence, conversational agents, and adaptive interfaces in improving usability of digital public and educational services.

VII. CONCLUSION

The increasing adoption of digital platforms has significantly changed the delivery of government and educational services in developing countries. However, the success of these platforms depends not only on their availability but also on their usability, accessibility, and ability to support users in completing tasks effectively.

This study investigated critical usability challenges affecting e-government and educational portals using a comparative evaluation approach. The study applied three established usability evaluation methods: System Usability Scale (SUS), Nielsen's Heuristic Evaluation, and Task Analysis to examine selected digital platforms from Nigeria, Kenya, Ghana, and Bangladesh.

The findings revealed that while most evaluated portals successfully provide essential services, several usability challenges continue to affect user experience. The major challenges identified include navigation complexity, system performance limitations during peak usage periods, mobile compatibility issues, and difficulties in accessing relevant information. The results also demonstrate that educational and e-government portals require continuous usability assessment to maintain

effectiveness as user needs and technological environments change.

The evaluation of the OGITECH student portal showed that institutional portals can effectively support academic activities when usability principles are considered during development. The portal provided clear navigation and access to essential academic services, although improvements in infrastructure capacity during high-demand periods remain important.

This study emphasizes that usability should be treated as a core software quality attribute throughout the development and maintenance of digital platforms [1]. Governments, educational institutions, and software developers should adopt user-centered design practices, conduct regular usability evaluations, and improve system infrastructure to create more efficient and inclusive digital services. Future research should explore larger-scale usability studies involving more countries, diverse user groups, and advanced evaluation approaches to further understand how digital platforms can better support users in developing regions.

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