



EXPERT USABILITY EVALUATION OF 28 STATE GOVERNMENT WEB PORTALS OF INDIA

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Abstract

This paper presents the usability evaluation of 28 state government web portals of India based on the evaluation of 79 parameters grouped under 7 broad categories such as accessibility, navigation, visual design, information content, interactivity, ownership and branding. We have juxtaposed the results of questionnaire based survey of Ap online, the Andhra Pradesh state web portal along with the results of expert usability evaluation based on 79 parameters to match and validate the trends. The expert usability evaluation presented in this paper highlights the lack of human work analysis in the design of the state web portals. In the end, the state web portals are ranked based on compliance with the overall usability parameters.

Keywords: State government web portals, usability, quality of governance, citizen centric design

1. Introduction

The republic of India has 28 states and 7 union territories with a population of approx. 1.2 billion people. All the states governments in India have established the web portals which are increasingly becoming the common communication interface between the citizens and the elected representatives of state government. Such portals have become the centrally accessible location for knowing the activities of state government and for availing various online citizen services. In this context, we wanted to investigate the following research question:

Are the Indian state government web portals useful and usable for its citizens?

In this context, we performed the literature survey to study similar usability evaluations of government websites in other countries.

2. Related Work

A brief overview of the literature survey along with our observations is presented below. Costin Pribeanu et al [2010] have carried out the expert usability evaluation of four municipal websites based on popular heuristics. The user testing in this work involved indicators of effectiveness in terms of validity, thoroughness and efficiency. This paper also mentions about aesthetic design as one of the parameters which in our opinion is difficult to define and evaluate. Ataloglou et al [2009] have evaluated the European ministries' websites based on 100 criteria grouped under 13 main dimensions. Specific quantifications for website features such as polls, discussion forums, RSS feeds discussed in this paper are quite insightful. But the abstract evaluation parameters like comprehensiveness, aesthetics, simplicity, appropriate mix of media are not fully explained in terms of how they were actually evaluated. Withrow et al [2000] have done the comparative usability evaluation between the old and the redesigned e-government websites. The usability testing is carried out based on user tasks. Inglesant et al [2005] have done the usability evaluation of the e-government system for mobile payment of the Central London Congestion Charge. They interviewed 50 charge payers and gathered the data regarding usability of the payment process. Latif et al [2010] carried out the accessibility evaluation on Malaysian e-government websites which is based on the W3C priority 1 checkpoints, which are very well defined technical guidelines. The paper supports both automatic and manual checking of accessibility compliances. Unlike the research reported so far, Sidi et al [2007] have reviewed only the credibility factor of 13 Malaysian state e-government websites. They have identified and reviewed various sub-elements which contribute towards building the credibility of a website such as accuracy and bias of information, tone of writing, physical address and contact details for the use, identity of the site sponsors, location of advertisements, applications, etc. Dominic et al [2011] have used diagnostic tools to evaluate the Asian e-government websites in terms of technical aspects such as loading time, page rank, frequency of update, traffic, mark-up validation, accessibility errors, etc. Hirwade's study [2010] provides quantifications of online services and e-government websites at centre, state and district level in India. It quantifies the number of digitized documents, online forms, acts and rules provided on each website. The websites are ranked on the basis of number of services provided. This work does not provide any information on the quality of online services. Baker [2009] provides the measurable criteria for content analysis of e-government websites in US which is addressed as enhanced usability benchmarks. Stowers [2002] has evaluated the federal websites based on the availability of desired features relating to legitimacy, services, navigation aid, information architecture, user help, etc. Wangpipatwong et al [2005] have evaluated the quality of information on Thai e-government websites by using the criteria such as accuracy, relevance and timeliness. Liu et al [2010] have evaluated the Chinese government portals on the basis of content index, functional index and construction index. *Web design & usability guidelines by U.S. Department of Health and Human Services (HHS) are exhaustive within its scope and focus. However, e-government websites can be very complex in terms of the information and services they are meant to deliver for the citizens. Apart from these we have come across several papers such as [Huihui 2010; Al-Khalifa 2010] which are meant to present heuristic based usability evaluation but it is an uneven mix of parameters [Ataloglou et al 2009] related to accessibility, content, functional and informational aspects. The*

published guidelines for Indian government websites [Verma et al 2009] do not provide coverage to usability.

Having studied a variety of usability evaluations of e-government websites, we have chosen to select a comprehensive and balanced set of evaluation parameters for the state web portals in India. Also, it is ensured that the parameters are specific and have minimum subjectivity.

3. Our Approach

Instead of evaluating only one or two aspects of state government web portals in India, we have chosen to evaluate them based on a balanced mix of parameters which also reflect the quality of governance in the particular state. Most of the research papers studied in the earlier section present the evaluation of e-government websites based on maximum possible parameters pertaining to one aspect in terms of accessibility or credibility or content or services, etc. Contrary to this approach, considering the fact that India is a developing country, we have identified the minimum essential parameters belonging to 7 different aspects of the state government web portals such as Accessibility, Navigation, Visual Design, Information Content, Interactivity, Ownership and Branding. These aspects are further fragmented into 79 usability parameters aggregated from within the 28 state web portals in India for relative comparison. Therefore, our usability evaluation parameters should not be compared with the most ideal set in the world.

The overall result of evaluation is considered as the integrated feedback on usability of the given state web portals. This research is concluded by ranking the state web portals based on their compliance with the overall usability parameters. We have ensured that the selected parameters are not abstract but tangible in terms of noticeable presence of a particular factor / indicator in the website. The evaluation is only in terms of the presence or absence of the particular factors or applicability of the given parameter. We have not evaluated the qualitative merit of the parameters e. g. presence of neat visual design is recorded as (1) whereas its absence or poor design is recorded as (0). It is also important to mention that we have clicked on all the links present on the home page of every state web portal but we have not evaluated the links which open into separate websites belong to different government departments. We have not reviewed the functionality of online services as it requires login name and password for registered citizens belonging to particular state. In a large scale reviewing exercise of this kind it becomes necessary to confine the scope for proper focus. Also, it is important to note that this study is based on the state web portals during the year 2010- 2011, the observations and ratings might change if the state web portals are modified or enhanced in future.

In order to strengthen the findings of our parametric evaluation, as an example, we have presented the results of a questionnaire based survey, which was conducted by involving 72 citizens for the APOnline Portal of Andhra Pradesh State Government. The specific parameters belonging to each aspect of state government web portals are listed in the tables below.

4. Evaluation parameters and the results

4.1. Accessibility

We have identified totally 18 accessibility parameters for which the technical implementation can be explicitly checked in the state government portals. The

findings of our accessibility review of 28 state government portals are briefly presented in this section.

Table 1. Accessibility Parameters

Sr. Nos.	Accessibility Parameters
1.	Site map / ToC of website / Description on how the website is arranged
2.	Information in English
3.	Keyword Search
4.	Use of alternative text for images
5.	Font size adjustment for readability
6.	Local language website
7.	Unicode or true type fonts
8.	Appropriate Page Titles
9.	Declaration of recommended browser
10.	Declaration of recommended specific display resolution
11.	Page Alignment in Browser
12.	Scalable or fixed layout
13.	Management of URLs opened as new browser window / sessions
14.	Visible link to return on homepage
15.	Indicate Doc or PDF or images if linked as download
16.	Use of bookmarks for long text
17.	RSS feeds
18.	Meta tags

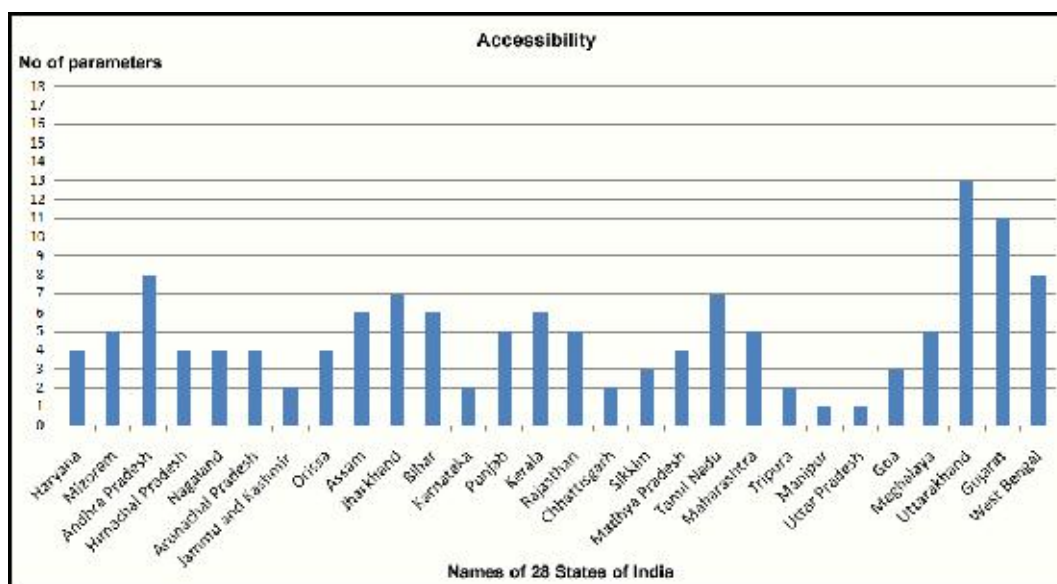
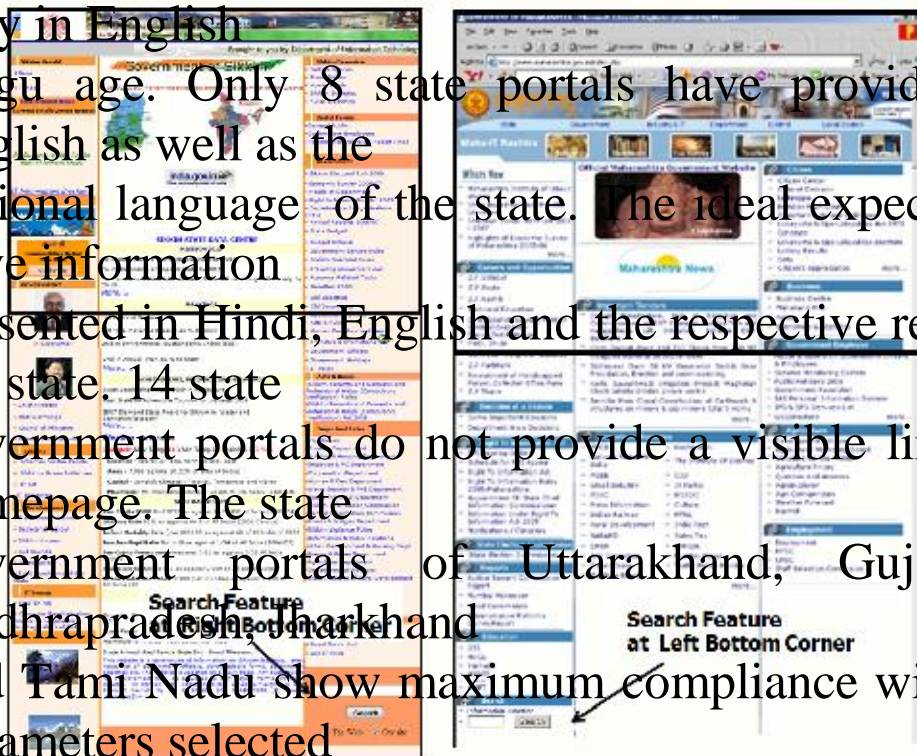


Figure 1. Evaluation of state portals based on accessibility parameters

Keyword search is provided by only 9 state government portals and among these in many places the search feature is not functioning properly. The search features are

placed in diverse locations on homepages such as left top, left bottom corner, right bottom corner, right middle side and the most preferred position which is top right corner. Refer figure 2 which provides the screen shots of two state portals in which the search features are placed in the most unconventional location such that one will have to search for the search feature itself. 20 state government portals do not offer the site map and the same number of portals provide information

only in English language. Only 8 state portals have provided information in English as well as the regional language of the state. The ideal expectation would be to have information presented in Hindi, English and the respective regional language of the state. 14 state government portals do not provide a visible link for returning to homepage. The state government portals of Uttarakhand, Gujarat, Westbengal, Andhrapradesh, Jharkhand and Tami Nadu show maximum compliance with the accessibility parameters selected



by us. Gujarat state portal is the only one which provides RSS feeds for pushing their information through search engines. As per our observation, the

Figure 2. Search features placed in the most inconvenient positions

compliance tend to appear reasonably okay. But unfortunately out of 28 state portals, 26 (92%) are below this threshold. For this minor exceptions, most of the state portals do not provide alternative text for images and thus make it completely unsuitable for the blind citizens who might use screen readers to avail online services. There is total confusion in managing the links to internal webpage, external links and document links. There is no clear logic behind whether the link should open a page in the same browser window or a new window. Many portals, you click to open a webpage you are surprised by getting a heavy PDF document which takes long time to download.

The major non-compliance with accessibility parameters for state government portals can be interpreted as lack of transparency and desire for reaching out to people. We could not load the website of Jammu & Kashmir after the accessibility evaluation.

4.2. Navigation

Table 2. Navigation Parameters

Sr. Nos.	Navigation Parameters
19.	Effective use of dropdown menus / tabs / hierarchical structure
20.	Use of breadcrumb trails
21.	Differentiate between links to internal pages and external websites
22.	Categorization / visible grouping / logical structuring of information
23.	Highlight hyperlinks on mouse over
24.	Prioritization based on use / importance to users
25.	Task / Goal orientation

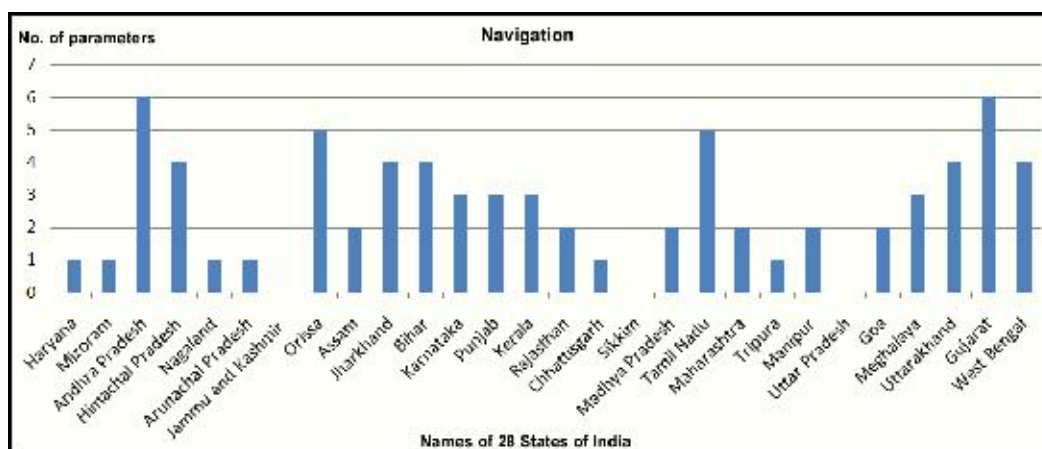


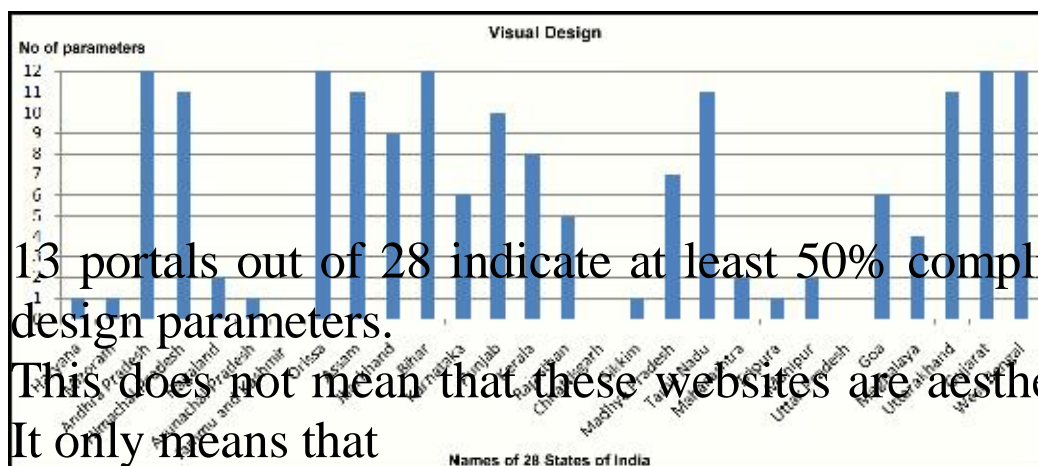
Figure 3. Evaluation of state portals based on navigational parameters

We have chosen 7 parameters to evaluate the quality of navigation provided in the state government portals. We found that most of the portals were missing the task / goal orientation and prioritization from user perspective. The state governments have not paid much attention to the citizen's point of view in terms of why would he/she visit the portal and with what expectation? The portals of Andhra Pradesh, Orissa, Jharkhand, Gujarat and West Bengal states are the minor exceptions to this as their navigation is adequately user oriented. 12 state portals out of 28 do not provide dropdown menus or tabular arrangement of information content. We found that only 4 portals provided breadcrumb trails, which is a primary requirement for website navigation. 24 (85%) portals fall below 50% compliance to navigational parameters. Uttar Pradesh website is the worst of all when it comes to structuring of information and navigation. Such high level of non-compliance to navigational parameters reflects lack of clarity in the understanding and organization of governmental activities.

4.3. Visual Design

Table 3. Visual Design Parameters

Sr. Nos.	Visual Design Parameters
26.	Color scheme / thematic colors
27.	Simple layout
28.	Grid based arrangement
29.	Categories highlighted by background color / style of label
30.	Use of CSS
31.	Quality / Size of images / graphics
32.	Logical arrangement of contents
33.	Effective use of Font styles and text size
34.	Color code for text / backgrounds / labels
35.	Proper use of scrollable text
36.	Proper use of blinking / animated icons / bullets
37.	Effective use of images / animation to highlight main topics / schemes
38.	Consistency of presentation within and across web pages



13 portals out of 28 indicate at least 50% compliance with visual design parameters.

This does not mean that these websites are aesthetically designed. It only means that

the visual design of websites has certain amount of neatness and proper composition

of various elements. Most state portals with fixed page layout have scored higher points for visual design. Whereas, the portals which are inconsistent in terms of scalability or fixed page dimensions have scored poorly. The state portals of Andhra Pradesh, Orissa, Bihar, Tamil Nadu, Uttarakhand, Gujarat and West Bengal score

4.4. Information Content

Table 4. Information Content Parameters

Sr. Nos.	Information Content Parameters
39.	Government's agenda and priorities
40.	Persuasive information (Progress of the state, why invest here)
41.	Information on schemes and services on education / agriculture / tourism / health / employment / Market / Weather
42.	Information on disasters / state calamities and guidance
43.	State news
44.	Important announcements / decisions / orders / policy
45.	Whats new on the portal?
46.	Daily state weather info.
47.	Media information
48.	Tenders
49.	RTI
50.	Dynamic web content
51.	State statistics
52.	Latest and upcoming events
53.	Awards and achievements
54.	List of departments
55.	Forms and other information
56.	Grievance Redressal
57.	FAQs
58.	Maps
59.	Government holidays
60.	Market rates

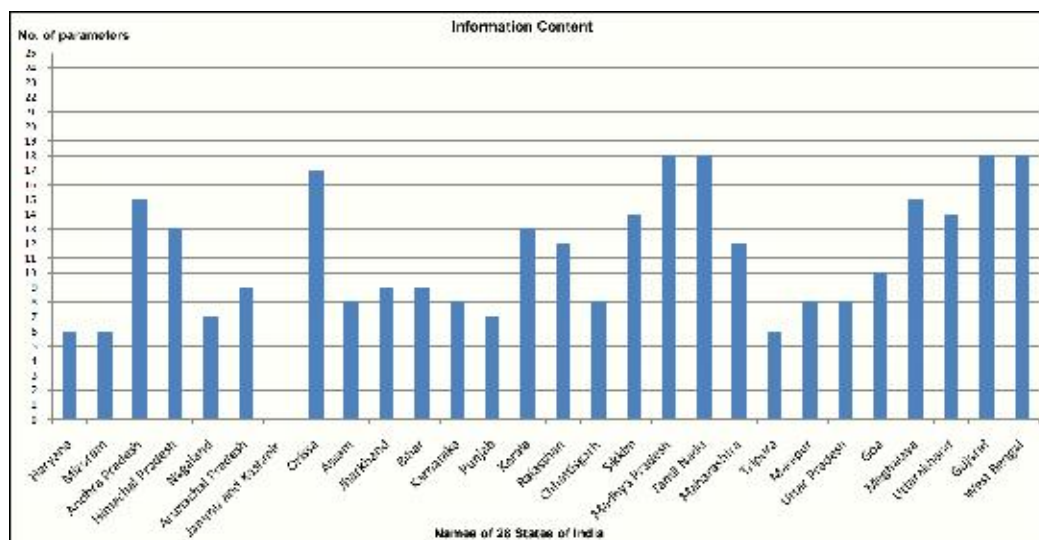


Figure 5. Evaluation of state portals based on information content parameters

A common pattern emerges if you observe the kind of information content is published on all state portals. We could aggregate 25 most common information categories after studying various state portals. This information is helpful in knowing about the state, activities of the government and offerings for the citizens. 8 state government portals out of 28 offer persuasive information to attract the investors to setup new industries and businesses. It means that large number of state governments are not using the power of Internet for reaching out to potential investors and businessmen who can create employment and generate revenue for the state. 4 state portals provide information to help in situations of disasters / calamities. It indicates the unpreparedness of a state in managing the disasters. 6 state portals publish daily weather updates. 5 state portals do not provide the state profile and demographics. 7 state portals have published information about their awards and achievements. Only 3 state portals provide some information on grievance and redressal. 6 state portals provide FAQ for citizens to answer their queries for obtaining common services. 15 state portals are below 50% compliance with the parameters of information content. There is tremendous scope to enrich the state portals with useful information content if you notice that even the 7 high scoring state portals show only 60-70% compliance as per our parameters. Very few portals provide accurate, detailed and scalable geographical maps of the districts and cities. Most of the portals provide PDF downloads of forms, rules and regulations without proper explanation on how it could be useful to citizens. It will be worth asking the citizens (users) about their information needs from state portals.

4.5. Interactivity

Table 5. Interactivity Parameters

Sr. Nos.	Interactivity Parameters
61.	Online services
62.	Online QA for citizens / discussion forum
63.	Poll for public opinion / participatory feature
64.	Online tracking of proposals / applications / etc
65.	Application of Web 2.0

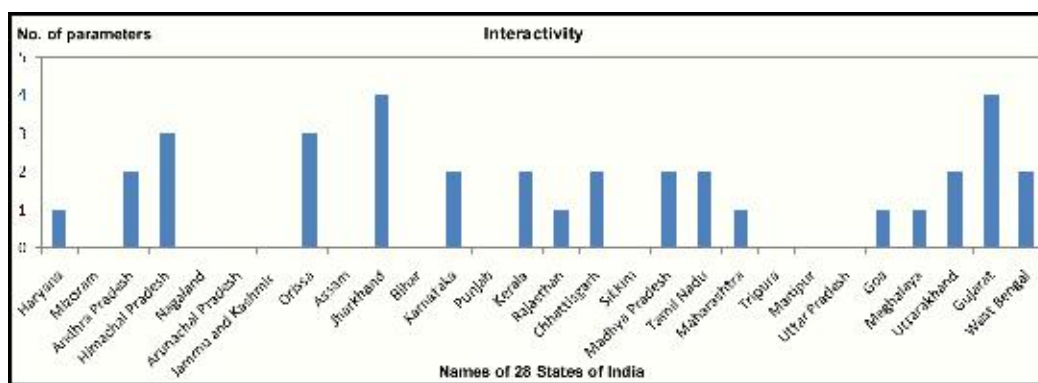


Figure 6. Evaluation of state portals based on interactivity parameters

In our opinion, online services greatly help in reducing the troubles of citizens and interactivity can get their participation in seeking their feedback for policy formation.

As evidently visible in figure 6., most state portals do not provide any online services or interactive features to get the participation of citizens. Gujarat, Andhra Pradesh, Orissa, and Jharkhand states provide many online services and interactive features. 24 (85%) state portals are below the 50% compliance threshold of interactivity parameters. Only Gujarat state portal offers various participatory features such as interact with government, participant in contest, take a pledge, contribute to Gujaratpedia, share ideas with government, opinion poll, e-greetings, etc.

4.6. Ownership

Table 6. Ownership Parameters

Sr. Nos.	Ownership Parameters
66.	Write to CM
67.	Web directories to other government departments and organizations
68.	Photograph, office and residential addresses of council of ministers and other key position holders of state
69.	Contact details of secretaries, district officials
70.	Department wise feedback
71.	Emergency information
72.	Security / quality certification
73.	Contact webmaster
74.	Website designed by

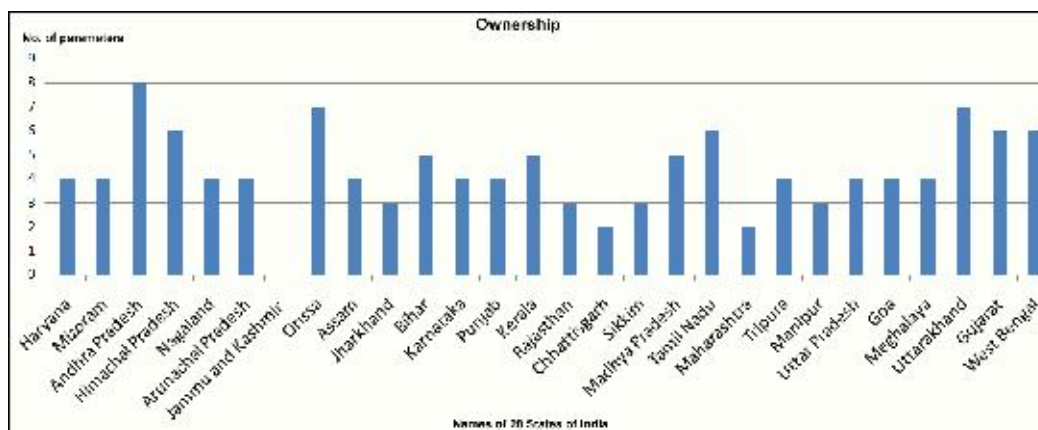


Figure 6. Evaluation of state portals based on ownership parameters

Write to chief minister feature is provided by only 2 state portals. There are 6 state portals which do not provide proper contact details of ministers, department secretaries and district officials. It can mean that the officials are hesitant to be reachable. 23 state portals do not allow you to offer department wise feedback. 3 state portals are providing the emergency contact details. 4 state portals are security / quality certified. Most notably, only Gujarat state portal offers subject wise contact details for citizens which makes it very user oriented. 18 (64%) state portals are below 50% threshold of ownership parameters.

4.7. Branding

Table 7. Branding Parameters

Sr. Nos.	Branding Parameters
75.	State / Website logo
76.	Projection of state missions
77.	Projection of local culture
78.	Photo Gallery
79.	State newsletter

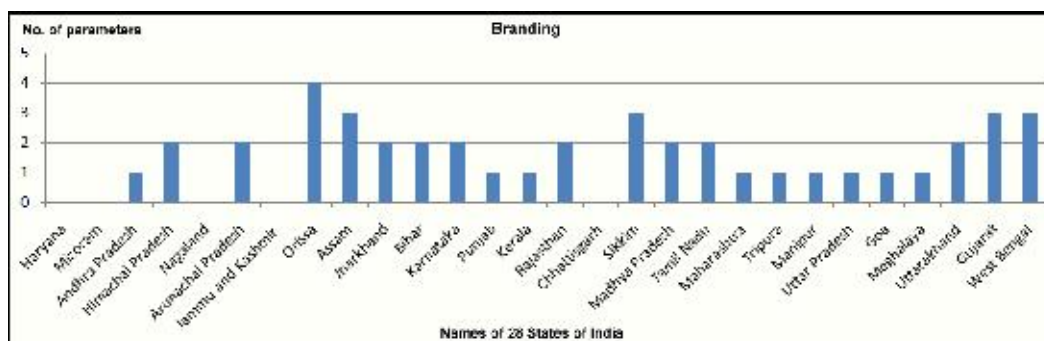


Figure 7. Evaluation of state portals based on branding parameters

15 state portals have published their state logos but majority of them are poorly reproduced. 13 state portals do have state logos on their portals. Only Sikkim state has explicitly published its missions to be accomplished by 2015. Local culture is projected by 9 state portals. Only Gujarat state portal releases state newsletter and a magazine. Orissa, Gujarat and West Bengal state portals are rated to be effective in terms of their branding. 23 (82%) state portals are poorly branded as per our evaluation.

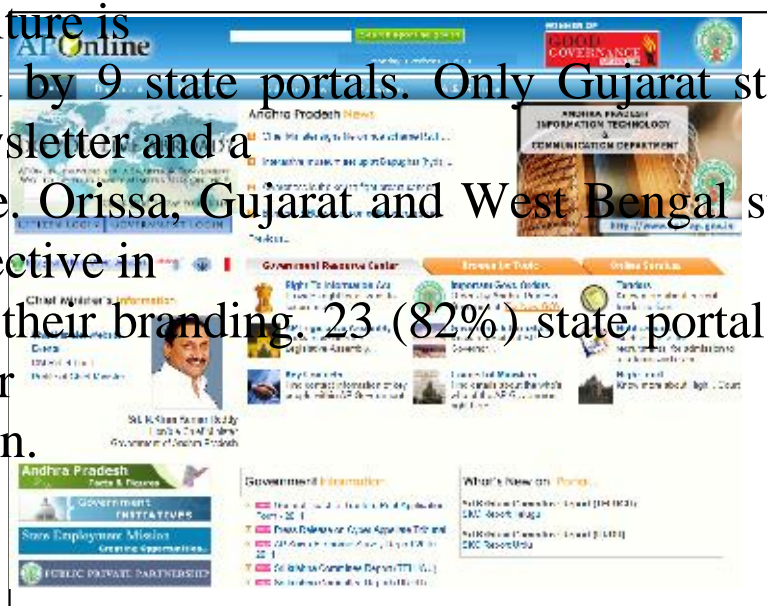


Figure 8. Screenshot of Aponline (Andhrapradesh State Portal)

5. Questionnaire Based Survey of APonline

Though this questionnaire based survey of APonline [Gupta, 2011] was carried out separately with a different focus, we are juxtaposing its results along with findings of our evaluation to compare the trends. 72 urban citizens who have used APonline participated in this survey and provided us with their feedback.

Table 8. Survey results juxtaposed with the expert usability evaluation of Aponline

Sr. Nos.	Survey questions for APonline	Positive user feedback in %	Parametric compliance in %
Visual Design			
1.	Do you like the overall design?	90.27% 100%	
Navigation			
2.	Did you know which page you were on, when you are browsing?	84.7% 85%	
3.	Are the links between the pages clear?	84.7%	
4.	Did you find the content to be logically structured?	72%	
Accessibility			
5.	Did the logical structure help you in finding the information you were looking for?	59.7% 44%	
6.	Have you used the search feature?	58.3%	
7.	How easy it is to use Aponline?	40%	
Interactivity			
8.	Do you prefer online mode of transaction?	51.7% 60%	
Branding			
9.	How welcoming do you consider the website to be?	36.6% 40%	

If you compare the results of our parametric evaluation along with the user feedback then one can notice the similarity of trends by approximate difference of 5 to 10%.

As part of this survey of APonline, Microsoft Corporations' reaction card was also used [Gupta, 2011] which consists of a set of 118 words that describe the quality of interaction a user has with a website. The users' were asked to mark the words which described their interaction with the website. Each word was classified into 'positive' (accessible, impressive, advanced) or 'negative' (dull, annoying, disconnected) words. Based on the response received from various users, a word cloud visualization is developed as shown in figure 7. As per our overall evaluation, Aponline is indeed one among the best state portals and the same has been substantiated by the user feedback.



Figure 9. Word cloud of user feedback for Aponline

6. Discussion

The trends visible in our expert usability evaluation can be interpreted in terms of the quality of governance as under –

Table 9. Interpretation of evaluation criteria manifesting the quality of governance

The aspects of evaluation	Manifestation of quality of governance
Navigation Organized approach	Organized approach, structured clarity, understanding of the activities and portfolios
Visual design Neatness, Attractiveness	Attractiveness, caring for people
Information content Communicativeness	Communicativeness, effort to inform the citizens, Reaching out
Online services and Interactivity	Effort to serve the citizens, participation
Ownership Willingness to be accountable	Willingness to be accountable to citizens, commitment
Branding Welcoming, enterprising	Enterprising, marketing approach Seriousness about business and development
Usefulness and Usability Overall citizen-centricity	Overall citizen-centricity

It is possible to interpret positive score on “accessibility” parameters as better transparency and negative score as poor transparency of governance. Similarly, other usability criteria can be interpreted for the quality of communicativeness, organized approach, commitment, accountability and citizen centric quality of the governance.

The state web portals are ranked based on their compliance as per our 79 parameters of usability. Gujarat, Uttarakhand, West Bengal, Andhra Pradesh, Orissa and Tamil Nadu are the top 6 state web portals as against the 20 state web portals

which are below 50% compliance as per our evaluation. It is important to note and recognize that most of the high ranking state web portals are designed and maintained by private companies in association with regional IT departments.

Table 9. Ranking of Indian state web portals as per the usability evaluation

Indian State Web Portals	Compliance out of 79 evaluation parameters
1. Gujarat	60
2. Uttarakhand 53	
3. West Bengal 53	
4. Andhra Pradesh 52	
5. Orissa	52
6. Tamil Nadu 51	
7. Himachal Pradesh 43	
8. Madhya Pradesh 40	
9. Kerala	38
10. Bihar	38
11. Jharkhand 38	
12. Assam	34
13. Meghalaya 33	
14. Rajasthan	30
15. Punjab	30
16. Karnataka 27	
17. Goa	27
18. Maharashtra 25	
19. Sikkim	24
20. Arunachal Pradesh 21	
21. Nagaland	18
22. Haryana	17
23. Mizoram	17
24. Manipur	17
25. Chhattisgarh 15	
26. Tripura	15
27. Uttar Pradesh 14	
28. Jammu and Kashmir 2 – incomplete evaluation	

Despite of India's leadership in Information Technology, large number of state government web portals reflects poor demonstration of technical and web design skills. It could mean that the quality of manpower hired for web design and development wasn't good enough. Many state governments seem to lack in supplying up-to-date, rich and useful information to the web design teams. Many of them are yet to tap the potential of offering on-line services. Surprisingly, the regional language assertions in domestic politics are not reflected in the state web portals as 20 of them provide information in English only, despite of the availability of UNICODE fonts in all Indian languages.

We can suggest some solutions to address some the problems observed during this research. The standardized user interface and user interaction patterns need to be designed and developed to compensate the lack of design skills. Technical and design teams working on state web portals should be trained to understand the usability concerns. A specialized content management system for state web portals with customisable features needs to be developed on priority to ensure compliance with all usability parameters.



Figure 10. Screenshot of Gujarat State Portal

7. Conclusion

The state web portals of Gujarat, Uttarakhand, West Bengal, Andhra Pradesh, Orissa and Tamil Nadu are usable for the Indian citizens. 20 out of 28 state web portals are below 50% compliance as per our evaluations hence can be considered as non-usable.

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