Эканоміка

BELARUSIAN AND VIETNAMESE E-GOVERNMENT PORTALS: USABILITY INSPECTION AND DESIGN PROSPECTS[1]

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Usability is a critical quality attribute of any e-government portal because of the diversity of its users. In this paper usability inspection of the e-government portals in Belarus and Vietnam is conducted. Usability evaluation methods are divided into three groups: testing, inquiry and inspection. The first two require participation of users so it is expensive to produce quality and reliable results. So in this paper a group of inspection methods that includes cognitive walkthrough (task-specific) and heuristic evaluation (holistic) methods is applied. These methods helped to find critical issues with usability which should be addressed. It is reasonable to draw the conclusion that the usability improves the user's experience quality when interacting with products or systems, including websites, software, devices, or applications. Suggestions and recommendations to fix the usability problems and to fit the current ICT trends to the e-government portals development are also provided.

Key words: e-government; e-government portal; usability; usability inspection; design prospects; information technologies.

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СТРАТЕГИИ УЛУЧШЕНИЯ ПОТРЕБИТЕЛЬСКИХ КАЧЕСТВ ПОРТАЛОВ ЭЛЕКТРОННОГО ПРАВИТЕЛЬСТВА В РЕСПУБЛИКЕ БЕЛАРУСЬ И СОЦИАЛИСТИЧЕСКОЙ РЕСПУБЛИКЕ ВЬЕТНАМ

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Проанализировано удобство использования порталов электронного правительства Республики Беларусь и Социалисти-ческой Республики Вьетнам. Методы анализа включают анкетирование и интервьюирование пользователей, а также проведение тестирования. Первые два предполагают участие большого количества пользователей, что обусловливает результаты с высоким уровнем достоверности, но практика их применения весьма затратна. В связи с этим проведено тестирование порталов электронного правительства с помощью методов сквозного когнитивного разбора и эвристических методов оценки. Приведенные результаты свидетельствуют, что данные средства позволили определить уровень удобства использования указанных порталов и пути улучшения их потребительских качеств. Сделан вывод о том, что удобство использования позволяет повысить эффективность эксплуатации информационных продуктов и систем, в том числе веб-сайтов, программного и аппаратного обеспечения. Представлены предложения и рекомендации, способствующие формированию потребительских качеств порталов электронного правительства, соответствующих современным направлениям развития информационных технологий.

Ключевые слова: электронное правительство; портал электронного правительства; удобство использования; анализ удобства использования; информационные технологии.

Belarus and Vietnam are long-term partners that collaborate closely and actively cooperate in many socio-economic and cultural fields. Our countries have close ties and our governmental and economic systems are very similar, so we strive for closer cooperation including public administration field. This fact is driven by the need for a joint research on e-government development. The research of our experience in e-government portals development will allow us to better understand each other, understand the features of state building of our countries and update the mechanisms of public services delivery and information systems that support these efforts.

Belarusian portal development for public electronic services delivery is an important and timely step to improve the mechanisms of interaction between the government, business and society. The portal was created in 2011 and is constantly updated. It is expected that in the coming years the portal will be a key link in the relationship between the government, society and business. Currently, in our opinion, it is necessary to solve the main issue - to make the portal easier to use. Simplicity and ease of portal usage will attract more users, reduce red tape, increase transparency and efficiency of the government.

Vietnamese e-government portal was first designed nearly ten years ago. It now contains a lot of information and services. Trends in ICT have changed the way people access e-government portal and they also have a lot of expectations. Vietnamese e-government portal will be 10 years old in 2016. So restructuring the portal homepage with focus on usability is a necessary and urgent task to make the government information and services usable by the citizens. We hope that the problems and solution ideas with the portal home page that we have addressed in the paper will spark more detailed studies to make the e-government portal more friendly and easy to use by all its users.

E-government portals in Belarus and Vietnam are young and it seems that the usability evaluation has not been carried out seriously. In this paper we use 'quick and cheap' methods to assess the usability of e-government portals. In particular, we use cognitive walkthrough and heuristic evaluation methods for our evaluation. Studies [1-3] have shown that these methods can find about 75 % of usability problems. So it is better to use them before other expensive testing or inquiry methods. To simplify further we use System Usability Scale (SUS) for cognitive walkthrough by John Brooke [3] and Jacob Nielsen's rules for heuristic evaluation [4,5] (table 1). The SUS is a 10 item questionnaire with 5 response options ranging from 1 to 5. This system gives a global view of subjective assessments 10 general principles, which help find usability problems in a user interface (UI) design.

Table 1

**Evaluation criteria of the e-government portals in Belarus and Vietnam
according to System Usability Scale and Jacob Nielsen's rules**

No.	System Usability Scale	Jacob Nielsen's rules
1	I think that I would like to use this system frequently	Visibility of system status
2	I found the system was easy to use	Match between system and the real world
3	I thought the system unnecessarily complex	User control and freedom
4	I think that I would need the support of a technical person to be able to use this system	Consistency and standards
5	I found the various functions in this system were well integrated	Error prevention
6	I thought there was too much inconsistency in this system	Recognition rather than recall
7	I would imagine that most people would learn to use this system very quickly	Flexibility and efficiency of use
8	I found the system very cumbersome to use	Aesthetic and minimalist design
9	I felt very confident using the system	Help users recognize, diagnose and recover from errors
10	I needed to learn a lot of things before I could get going with this system	Help and documentation

The paper has made the following contributions. First, we point out usability problems with e-government portals in Belarus and Vietnam using the two inspection methods mentioned above. Second, we give recommendations to resolve the issues. Third, we know that the e-government portal is just a starting point for many other e-government services whose websites are designed and developed by different parties, so our evaluation approaches and results will be very helpful and practical for these parties. The ultimate results are a usable portal and services for all of our citizens.

UsabMty inspection of portal.gov.by

Cognitive walkthrough. Belarusian e-government portal was analyzed and results of its evaluation are presented in table 2.

Table 2

Ratings and comments for SUS questions of portal.gov.by

No.	Score	Comment	Suggestion
1	2	The system is very hard to use meaning that it'd be easier to contact appropriate governmental agency directly then trying to use this portal. It also doesn't have unique functionality that a common citizen will need to resolve his/her issue in the easiest way	It's important to conduct UX/UI research and define real needs of the users. Then the system should be redesigned using international UX/UI standards and guidelines
2	5	The system is really complex and it was not built using 'intuitiveness and efficiency' UX/UI rule	The system should be simplified and provide its users with more user-friendly services
3	3	The system is a central point for negotiation between citizens and the government	The government should try to reach its audience in the easiest way and understand its wishes, thoughts and ideas. That would be possible if the system will become easy to use. New UX/UI should be developed following international standards and guidelines
4	4	The system is not user-friendly and its users would need to have a technical person online to be able to use the system. Currently, such person is not available for support	Simplifying systems will not require having plenty of technical support persons online. Currently, the system management should provide 24/7 online service of applying for technical support

The end of the table 2

No.	Score	Comment	Suggestion
5	2	It was impossible to find integrated functions in the system because citizens have to submit filled-in forms and cannot track workflow results	It's worth implementing tracking results function
6	4	There is too much inconsistency in the system and most services are not automated. Users have to download forms, fill them in and send them to the e-government agency by regular post. There are a lot of services that are not grouped to similar life situations and some require different approaches for applying	Provided services should be redesigned and way of delivering should be changed. All the services should be delivered using the same approach because users could lose their way to applying for the needed service
7	2	The system is not easy to learn quickly. It is difficult to find relevant information, published news are very outdated. The search engine does not process requests properly. FAQ section is not relevant for users. English and Belarusian versions of the system are not available	The system should be redesigned that would let the users learn it quickly. Video tutorials should be developed and webinars conducted. That would help the users learn the system
8	5	The system is very cumbersome to use. It has plenty of pages, a lot of navigation elements, many services have close meanings but are implemented in separate sections, and some workflows need revising because of its complexity for the end-user	UX/UI of the system should become more easy to use, sections should include closely related groups of services, and quantity of the pages should be optimized. The user should employ the portal for resolving his/her issue with minimum efforts
9	1	End-users may not feel confident using the system because it's difficult to predict its response. Some pages display differently, some services are delivered in various ways. The users may get confused because of implemented approaches	The system should become more predictable. That will help the users to understand the system and feel confident using it
10	8	There is a need to learn more about the system before getting going with it. It requires the users to apply for training that will improve their usability skills and will let them become more confident using the system	The system's management staff has to provide the users with online/offline training sessions

Note. Developed by the authors.

Heuristic evaluation. Inspection results of portal.gov.by with ten usability heuristics are presented in table 3.

Table 3

Main issues of portal.gov.by with respect to Jacob Nielson heuristics

No.	Comment	Suggestion
1	The system does not keep the users informed about what's going on within it. Users clicks appropriate links and has no idea about further steps of the system	The system should notify the user about its progress and steps it should take to complete the user's request
2	The system doesn't speak the user's language. It employs difficult terminology that most of users will not understand without using appropriate glossary	Make the language of the system simpler and more user-focused
3	The system does not support undo and redo and does not have 'emergency exit'. The user that has made a mistake should start initiating the service request from the beginning	Let the user to step back if the mistake was made and understand the current step of the process
4	Different sections of the system behave differently	The system should behave in accordance with the global usability standards and behave in the same way
5	The system does not have any error prevention messages. The user might face an error and will not be able to understand its reason	Error prevention mechanisms should be created and become user-friendly

No.	Comment	Suggestion
6	The system forces the user to remember where the needed information sections are located	The system should be redesigned and become easier to use with less information to remember
7	The system does not have accelerators. Experienced and non-experienced users have to employ the system in the same way	The system should recognize the user's efficiency and adapt to his/her behavior
8	The system is overloaded with information and it's hard to define what pieces are relevant and which ones are not	The system's information architecture should be redesigned
9	The systems hides the errors and restarts its usage from the beginning	The system should show the user the occurred error and help him/her to initiate its usage from the relevant point
10	The system does not provide its users with documentation	The system's features should be documented and appropriate user guides and video tutorials should be created

N o t e . Developed by the authors.

Usability inspection of www.gov.vn

Cognitive walkthrough. According to the SUS questions we describe our evaluation results in table 4.

T a b l e 4

Ratings and comments for SUS questions of www.gov.vn

No.	Score	Comment	Suggestion
1	2	Many people need/have to use the system to find official and up-to-date information	As people who accessing the website have different purposes, let them see the direction they should choose in the visible part of the homepage. So the G2C, G2B, G2P sections should be moved up. In real world portal, a small map is usually placed near the portal, so the web portal sitemap should also be placed on the right top of the home page
2	4	The homepage is a bit complex with unclear structure	Sitemap should reflect the layout/structure of the portal, and it should somehow let the users know how the information is organized
		The left side contains search function, a list of topics with no category title and two feedback functions for a citizen. The right side is mixed with variety types of information	The search function should be on the top panel, the list of topics should have a title on top and the two feedback functions can be grouped to one and/or can be moved to G2C (Chinh pM voi Cong dan) section
3	3	We were trained in IT so we can use the system, but she is not very easy to us. There is too much information at the portal and at the center is the news block. People who familiar with computers and web would be able to use, but the others would find not easy to get/find what they need	User-oriented design or task-oriented design should be clearer to assist the users. The portal homepage now seems focus on news as news is the center of the homepage. Singapore e-government portal (http://www.e-gov.gov.sg) has user-oriented functions at the center. Korea (http://korea.go.kr), U. K. (https://www.gov.uk) and Norway (http://www.norge.no/en) e-government portals have a directory at the center
4	3	We would like to be trained about the way the information is organized at the portal, so that we would be able to find information in the easiest way	Some help functions should be on the top right area of the homepage to show how the portal is organized or how to find information the users need. Search function should be on the top panel and search input textbox should be here for the user to input text instead of going to another page

The end of the table 4

No.	Score	Comment	Suggestion
5	4	The portal contains mainly links to other web pages or websites. They are grouped into sections, but many sections have no titles and the items in these sections are obviously show their group intention, so the integration is not appropriate	The portal homepage should only show groups at the center and some important links that the users would click at the right side. Important links can be services that most people would want to use at that time, or they are the most frequently used or new ones
6	3	Some inconsistencies, e. g. some links open a new tab, which is inconvenient for novice users and annoying for others	Links in the same domain and subdomain should stay in the same tab and pages at these links should have the same header panel
7	4	People can learn to read information but it is not easy to find what they need; it is not designed to be task- or service- or user-oriented	The portal is easy to use, just clicking on the links, but may not be easy to complete a task
		On mobile devices the UI could be difficult to use as users have to scroll horizontally and vertically	Separate mobile pages or responsive web design should be used, like Norway, U. K. and Korea portals
8	3	The site is mainly informational, so you just click the links to read more. It's not very difficult to use	Like the above, the portal homepage should be simplified with direction information for users, but there are no details yet
9	3	Users don't have to provide personal information so they should be comfortable to use the portal. It's just like exploring a small library, but the library is not very well organized so that it may be difficult for the users to find what they need. Electronic services should be easily found by users to use	The portal should be redesigned with focus on users. It should answer questions such as «What would they want?», «When do they access the portal?», «What are the main roles of the government portal?»
10	2	People who know computer and browser should be able to use the site	The portal requires some basic knowledge from the users to be able to use the system effectively. It should address novice users who have very limited knowledge about computer and Internet. Some help links to online manual, telephone, Q&A, video, or some tutorial functions should be placed at a visible location of the portal homepage, usually next to a sitemap link

N o t e . Developed by the authors.

Heuristic evaluation. The portal content is very rich and has many links to other web pages and other websites. Our approach focuses on the first level of the links, which means we analyze the portal's homepage and other main pages that are linked from this homepage. Main findings are highlighted in table 5.

Table 5

Main issues of www.gov.vn with respect to Jacob Nielson heuristics

No.	Comment	Suggestion
1	Does not keep users informed about what is going on. Lack navigation path showing where the users are in the site. Lack feedback to users when selecting some menu items. Menu items are not highlighted when users click them (both top and left menus)	Add a navigation path below the top menus. Menu items should be highlighted in the new page or current page when clicked
2	Information seems not appear in natural and logical order. Top menu should link to direct units under the government, such as ministries, and/or to G2B, G2C. We found that the link 'http://www.gov.vn/portal/page/portal/chinhphu/bonganh' is more appropriate to be the portal	Learn from other portals such as (www.korea.go.kr/), U. K. (www.gov.uk/) and Norway www.norge.no/en) and make similar portals

No.	Comment	Suggestion
3	Undo is not possible for some actions. Many links (70 with target="_blank") open a new tab but the new tab does not have any link to allow user to go back to the previous page. A new tab has a link to gov.vn portal, but it opens the portal in the current tab - many people do not know how to close a tab, or do not notice it using mobile browsers	Make a header fixed for all subdomains of the e-government portal, or other e-go-vernment pages should share the same top panel. In that header, a link to go back to previous page and a link back to portal should be always easy to access. For a long web page, a link to go back to the top of the page should be added
4	Some actions do not behave in the same way. Some links open new tabs, some don't and there are no indicators, signs to distinguish them. Does not conform to standards. Users cannot click on logo to go back to the home page. Some sections have title, some don't. Images, fonts on the right side are not consistent. Search button is placed in the same group with the left menu	Add a popup icon next to links that open in a new tab or window. Try to conform to common and practical standard, such as guidelines.usability.gov
5	Most of the web pages that link from the portal contain only information and not many of them are forms, so this rule is generally not applicable	When errors occur, display a friendly message, and show a menu button to go to the previous page or homepage
6	The portal does not have plenty of dialogs, so this check is generally not applicable. Users are familiar with some common icons, images such as home, email, so having these icons would make links easier to recognize	Add common icons to links such as home, back, email, feedback, etc.
7	There are no almost accelerators. When mouse is not convenient, using tab key on the keyboard to jump through links, focused link is not clearly highlighted so it is hard for users to find/track it. The height of the items on the left menu should also be higher so that it is easy to 'click' on touch screens	Make touch friendly, keyboard friendly and do not assume users always have mouse to use the portal
8	Many phrases are not concise, e. g. «Gioi thieu C6ng TTDT Chinh рьй» - > «Gioi thieu», «Bao dien to chmh рьй» - > «Tin tiic», «Trang Da phuong tien» should be removed as they link to the home page. There are also many repetitions	Make wording more friendly and short. Reduce repetitions of content such as in http://www.gov.vn/portal/page/portal/chinhphu/thongcaobaochiVBQPPL
9	Error message is not friendly (http://www.gov.vn/abc; http://baodientu.chinhphu.vn/page/abc)	When errors occur, the system should display a friendly message, and show a menu button to go to the previous page or homepage
10	Help document was not found, but it is OK as the portal is mainly at the level of providing information. Sitemap does not match menu/homepage structure. Sitemap links to http://gis.chinhphu.vn/ but this does not work and no friendly message is shown	Support or help link and sitemap link should be always on the top right corner of the portal

Note. Developed by the authors.

Discussion and recommendations

Belarusian portal. Belarusian portal is a very important interaction tool between the government, society and citizens. In fact, this portal is a mirror of the government, business and society as a whole and its efficiency depends on how well it is designed, developed and implemented. Our research revealed a number of problems in the portal - inconvenient user interface, usage of outdated technology, content that is hard to understand, confusing menus, lack of user documentation, etc.

In order to increase the interaction efficiency of the government it is necessary to implement a set of measures for serious portal revision. First of all, it's important to pay special attention to usability issues, interaction experience design, and development of modern information architecture. The most advanced technologies in the portal development should be used because outdated technologies will not allow developing the portal and integrating it with modern information systems in the future.

Vietnamese portal. Vietnamese e-government portal has made a great contribution for its citizens in accessing to e-government information and services. However, as we can see from the obtained results Vietnamese e-government portal still has some basic problems with usability which should be addressed to make information and services reachable by its people and at the same time increase the ranking of the portal.

Some of the problems can be easily fixed by a few lines of code, such as by modifying .ess for links that open pages in a new tab and for focused link. Adding a link to portal homepage for the portal logo is also easy. Moving sitemap and add support/help link to the top panel does not require a lot of work as well. News section replacement by a few links should also be feasible.

Some of the problems require more work but learning from high ranking portals such as of Norway, Singapore, and Korea should make the work feasible. As the portal links to many other pages and sites, we know that making all these pages having some consistency takes time and rework. But the government should produce some general and basic rules regarding the design of the page so that other governmental sites linked from the portal should be conformed so that in the long run make not only the portal homepage but also its sub-pages and sub-sites more consistent and more usable by most of its users.

One of the emerging technologies in building website is web components [6, 7]. The e-government portal may start paying attention to this technology and make it easier for other governmental sites to integrate with the portal. For example, a header component can be created and other sub-sites will just need to include the component in their pages.

Today and in the near future, more and more people will access the portal and most of them will use their mobile devices to access the information and services. So mobile first strategy should be initiated as soon as possible. As there are many types of mobile devices, using responsive web design approach will help reduce the cost of building several versions of portal for different screen sizes [8]. The portal may also consider providing some of its information and services via Web API so that other third parties can build native applications running on mobile devices for the portal access.

The usability research of the Belarusian and Vietnamese e-government portals has allowed us to identify common development problems, determine the directions of public services improvement and delivery in both countries. Areas for further co-development, closer integration and cooperation in the provision of public services focused on citizens were also identified.

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