Strategic partnership funded by Interreg Baltic Sea Region Programme

Project: "Empowering Participatory Budgeting in the Baltic Sea Region – EmPaci"

Usability Study of Existing Web Pages

Group of activities 4.1: Output 2

Responsible Partner: University of Rostock

December 2020

Status: Final (English)

Usability Features in national partner language to be added

List of abbreviations

GoA.. Group of Activities

ICT .... Information and Communication Technology

PB .... Participatory Budgeting

UX .... User Experience

WCAG ....Web Content Accessibility Guidelines

Table of Figures

Tables

Table of Contents

1 Introduction

Usability describes how a system, product, or service can be used to achieve specific goals with effectiveness, efficiency, and satisfaction in a particular context of use.[1] The term *user-friendliness* is also used as a qualifier to refer to the design knowledge, competencies, activities, and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, or usability evaluation. In summary, usability is a quality feature that assesses how easy user interfaces are to operate. *User Experience* (UX) describes users' perceptions and reactions resulting from the use or expected use of a system, product, or service. UX captures the holistic experience of a user in a system, not only functional, but also emotional and aesthetic aspects are a part of this kind of perspective.[2] However, UX also results from the user's internal and physical state, which is caused by previous experiences, attitudes, skills, abilities, personality, and the given context.

In a Participatory Budgeting (PB) system, many factors influence the overall user experience. A lot of these aspects are not technical, like socio-economic, political, or behavioral influence factors. Arguably, these aspects are out of control for the designers of a PB system. Despite this, we in fact can control technical aspects of information and communication technology (ICT) systems and process-related facets to a limited degree.[3] This IT involvement is even more important, as the impact of a positive look and feel of public websites exceeds the design aspects: A study in the UK showed a strong correlation between credibility and usability. Those with high usability are also rated as more credible[4]. Therefore, a well-designed PB-website is expected to have a substantial influence on the overall perception of the PB-initiative. Additionally to the UX-guidelines, public institutions have a special obligation regarding accessibility. The classical UX-process often focusses on the needs of an average user or targets a specific user group. Public administrations, though, must include all citizens regardless of age, technical skills, or disabilities. The EU Council outlined this requirement in 2009.[5]

---

[1] ISO (2018).
[2] Richter, M./Flückiger, M. (2016).
[3] Omar, A./Weerakkody, V./Sivarajah, U. (2017).
[4] Huang, Z./Benyoucef, M. (2014).
[5] Council of the European Union (03/31/2009).

This report assesses whether current PB-initiatives follow usability and accessibility guidelines. In total, we evaluated 50 different cities for the fulfillment level of 47 distinct design aspects. Using the analyses, we worked out which design elements can be considered standard and identified shortcomings of current approaches. As most of our current partners in the EmPaci project do not have a functional PB-initiative yet, we choose other cities from different parts of the world to learn from. This analysis is done in conjunction with the feature matrix. The feature matrix also contains the usability information that this analysis builds upon. The data can be downloaded and used for further research. A manual is available in the output document 1 of Group of Activities (GoA) 4.1. This output is a joint work between the Russian project partners (ITMO University, St Petersburg) who were responsible for data collection, and the German project partners (University of Rostock) who crafted this report and coordinated the efforts.

The following section gives a detailed overview of the assessed items. Section 3 is concerned with an analysis of these items, followed by a conclusion.

2 Assessed Usability and Accessibility Features

In total, we assessed 23 distinct quality features. They originate from the works of Kalbach[6] and Ertel & Laborenz[7]. These studies were adapted towards a business-related context to make these items understandable not only for IT-engineers but for everybody. Figure 1 shows the categorisation of these quality features into five distinctive sections. *Navigation* is concerned with a consistent browsing experience that follows best practices in website design. *Search* assesses whether the web-page has a functioning search capability. *Content Design* regards the readability and the structuring of the information on the web-page. Readiness for smaller screen sizes of tablets and mobile phones is examined in *Mobile Enablement*. *Accessibility* is the largest category and is used to assess the optimisation for users with disabilities like poor eyesight, motoric impaired or other sensory impairments.
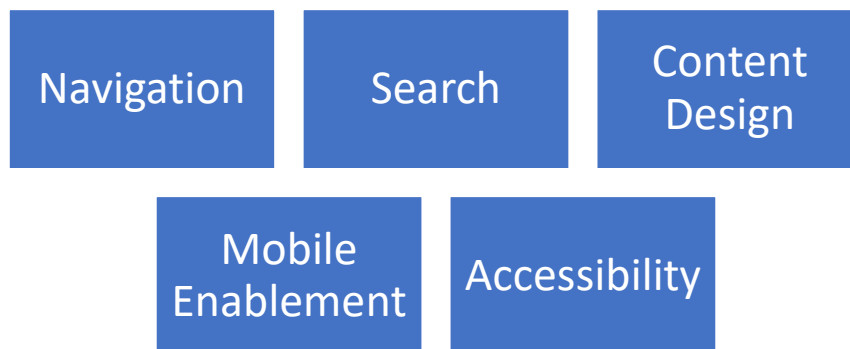

Figure 1: Usability Categories

The categorisation is the groundwork for further analysis of the different PB-initiatives. It additionally serves as a catalogue of desirable usability features that not only the EmPaci partners can use to implement and improve their own PB-process, but also other local authorities when implementing their online surfaces for PB. The feature matrix's functional facets are more like a catalogue, where interested cities can pick the functions that fit best to their own needs. In contrast, this collection of usability-related assessments is recommendable for every software-supported PB, regardless of the process-specific implementations.

The Table below shows a detailed description of the usability and accessibility-related items.

---

[6] Kalbach, J. (2008).
[7] Ertel, A./Laborenz, K. (2017).

Category	Item	Description
Navigation	Navigation consistency	The accessing throughout the web-page stays the same for all categories.
	Internal links - open in the same tab	Internal links open in the same browsing tab for an uninterrupted browsing experience.
	Internal links - "Back" - button works	The back-button works within the navigation of the web-page. Users get to the resource they visited before, not, e.g., the main-page.
	External links - open in a new window/tab	Links to external resources are opened in a new tab, keeping the current PB-page open.
	External links - warn before opening a new tab	Before the new external resource is opened in a new window/tab, the user gets a warning.
	Functional links	All links are working correctly.
	Color change - visited links change the color	By changing the color of visited links, users do not unintentionally revisit the same pages.
	Location is visible	The user knows at all times, where his/her location is on the web-page. Possibilities for doing so are breadcrumb-navigation or a sidebar navigational item.
Search	Search exists	The web-page provides search functionality that enables the search of the whole PB-website, not only specific items like the published list of proposals.
	Easy to find	The search is easy to find and in a location where the user expects it to be (e.g., top right).
	The size of the search box is sufficient	The size of the search box is sufficient. The user does not need to use short, imprecise queries because longer ones would not fit in the input field.
	Always visible - The search box is on every page	If the user does not find the resource he/she is looking for, he/ she wants to search regardless of the current location.

Table 1: Detailed Description of Assessed Usability Items (Navigation & Search)

Content Design	No information overload	Too much information prevents users from making decisions, especially if they are asked for information (e.g., in forms). In these cases, the web-page gets split up into smaller chunks (pagination). For information presentation, the user should have the option to switch on and off the pagination (e.g. for printing).
	No capitalising	All cap texts are hard to read. While this is feasible for small chunks of information, more extended parts like headings should not be capitalized.
	Prioritize content	Essential elements like "log-in" or navigation options stand out in comparison to the rest of the website.
	Pictures have a sufficient resolution	The images on the web-page are not blurry and pixelated.
Mobile Enablement	Resize appropriately for mobile devices	Depending on the device the website is accessed with, the layout and elements adapt to the available screen size.
	Button Size for mobile devices	The button size in the mobile design is sufficient, at least 10 x 10 millimeters wide.
Accessibility	Optimized for poor eyesight	The design has high contrast, thus is readable also for people with bad eyesight. Designs with e.g., light-gray text on a dark-grey background is not used.
	Visual feedback is not limited to colors	A colorblind person can, e.g., not distinguish the difference between green and red. If an input field is marked, it should not only depend on color but, e.g., also on an icon.
	The website provides meaningful alternative text	Information is not only understandable with corresponding pictures, but the text alone provides enough information to use the web-page.
	All essential elements of the web-page are accessible by keyboard	People with motoric impairments are not able to use a mouse. The elements, therefore, must be usable with a keyboard as well.
	Pages are opened within a reasonable amount of time	The user interface does not feel slow, but responds naturally.

Table 2: Detailed Description of Assessed Usability Items (Content Design, Mobile Enablement & Accessibility)

3   Usability Analysis

The following section contains the analysis of the different cities (50 in total). It gives a quantitative overview of the fulfillment level of the various usability criteria shown in Table 1. The content is further structured along the categories presented in Figure 1.

3.1   Navigation

The navigation analysis is concerned with the routes of the web-page. In a nutshell, a website should confirm the browsing experience a user is familiar with. This includes concepts like the behavior of links or a functional back-button.

All web-pages use consistent navigation that does not change while browsing through different pages. The user also views his/her current location on every page for all assessed PB-initiatives, e.g., through breadcrumb navigation or a sitemap. Further, all initiatives provide a functioning back-button, all internal links open in the same window, change their color once they are clicked, and all websites warned the user before leaving the website through an external link. Further, we detected no broken links in none of the PB-websites. However, as it was not possible to check every available link, this statement is merely based on a small sample per website.

As a result, we can state that most of the current PB-initiative do surprisingly well regarding their websites' navigation. The only minor problem persists in the opening of external links – two of the 50 initiatives (Uktha, Russia and Vologda, Russia) open an external link in the same window, leaving the PB-website in favor of the external resource. However, regarding the variety and amount of examined websites, this can be considered a minor deviation from the overall sound quality.

3.2   Search

Even with a clear structure, it can be challenging to find specific items on large websites. Search capabilities offer an alternative – the right search term is often the fastest way to the requested resource – under the condition, the user knows the correct keywords and what she or he is looking for. Almost all larger websites today utilize some form of search capability.[8]

---

[8] Bühler, P./Schlaich, P./Sinner, D. (2017).

This section analyzes the availability and quality of the search function in PB-websites. From the total 50 websites, 38 offer some search capabilities. Almost all of the cities with search capabilities provide them with sufficient quality. All of the search functions are visible throughout the whole browsing experience and have a readable minimum size. Almost all are easy to locate, except for Usinsk, Russia, where the search window was on the bottom-right of the page and requires the user to scroll down before it is noticeable.
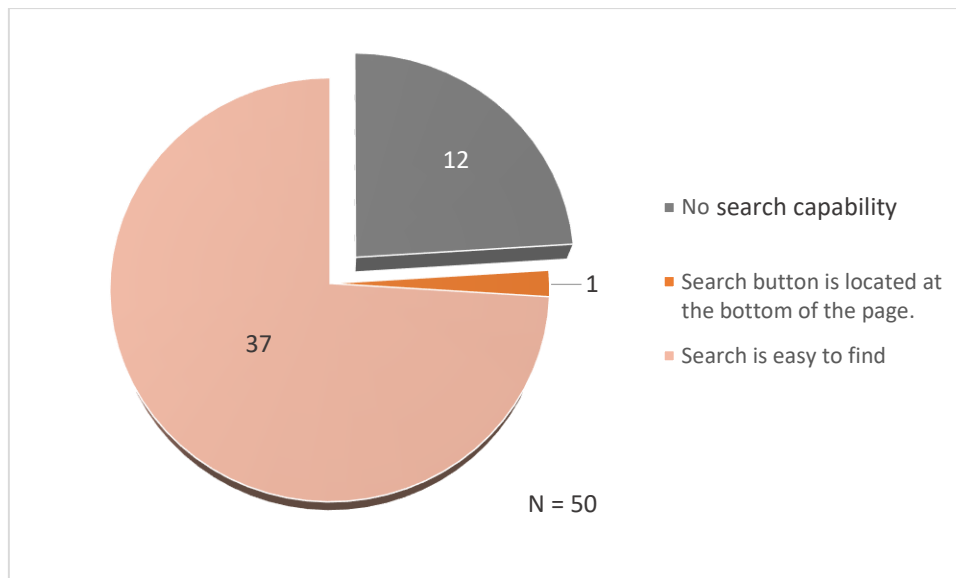

Figure 2: The Availablity and Quality of Search Capabilities of the Assessed PB-Initiatives

3.3   Content Design

While most of the other usability-features in this document are concerned with the usability-related functional capabilities of a PB-system, this section examines the non-functional structuring of the information.

Most of the websites provide well-structured content. None of the assessed websites have issues regarding information overload, misplaced capitalising, or wrong prioritisation. However, while 47 of the assessed 50 cities offer their pictures in high quality, two PB-initiatives are rated medium for their image quality (9 communes, France and Kauniainen, Finland), and one is rated "low" (Jena, Germany), because of pictures on the PB-initiatives website with a low resolution.
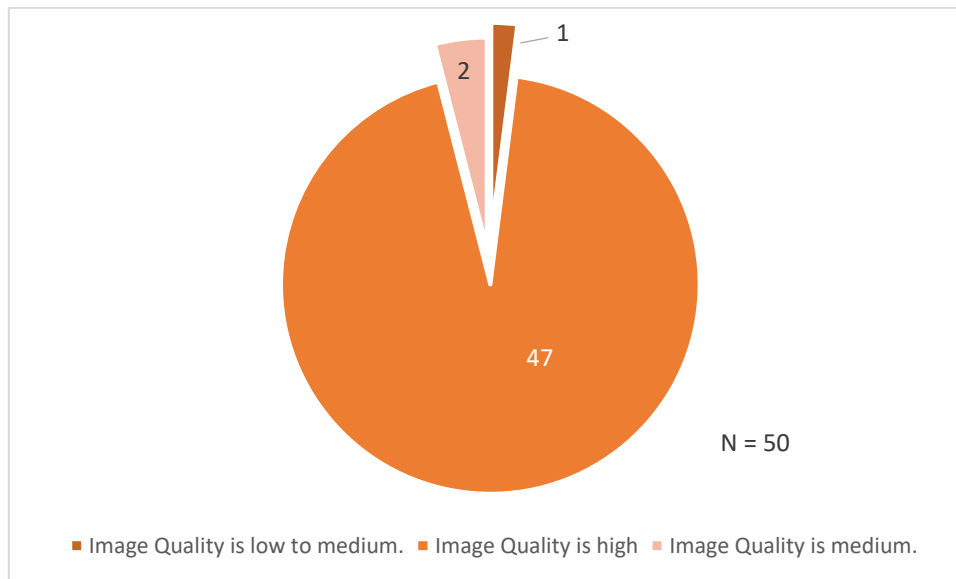
Figure 3: The Varying Image Quality on the Different PB-Websites

3.4   Mobile Enablement

Mobile internet access is increasing and has a penetration rate of 82,54% in Germany, projected to climb up to 88,23% in 2025.[9] Other countries like France and the UK confirm this trend.[10] This emphasizes the customisation of web-pages for smaller screen sizes and touchscreens. We assessed whether the websites are optimized for mobile devices and sufficient to ensure comfortable handling regarding touch control limitations. Here, we found no significant shortcomings in the programmed websites. All websites do resize if accessed from a small screen. Figure 4 gives an example of the city Kauniainen in Finland, accessed from a computer and a mobile phone screen size. Further, we assessed the mobile-optimized PB-website button size and found that all input fields offer an adequate size for use without a mouse.

---

[9] Statista (07/14/2020), URL: statista.com.
[10] Statista (10/08/2020), URL: statista.com.; Statista (07/04/2020), URL: statista.com.

Figure 4: Example of Mobile-Optimized Websites
Note: Accessed From a Desktop (Left) and a Mobile Device (Right)

3.5 Accessibility

As the European Union Council stated, public administrations have an outstanding obligation to make their service accessible for all citizens regardless of potential disabilities.[11] This recommendation was put into law in 2016, requiring member states to fulfill minimum inclusion requirements for their e-Government applications.[12] This section assesses the accessibility for users with sensory or motoric impairments. The functional assessment builds on the works of Dungga, Weissenfeld, and Klein.[13]

3.5.1 Supporting the Motoric Impaired

The handling of classical input devices like a mouse or a touchscreen requires fine-motoric skills. Often, people that lack these skills use the keyboard as a fallback-input unit. However, the efficient usage of these alternative devices is just possible if the website provides meaningful mouse-alternatives like shortcuts.

Most of the assessed cities do not offer these alternatives. Out of the 50 assessed cities, 47 do not support the mere use of shortcuts and keyboard. Two of the municipalities (Greensboro, U.S.A. and Cluj-Napoca, Romania) provide essential support for keyboard-driven navigation by, e.g., prioritising tab-stops or quickly referring to the accessibility support. One PB-initiative (Porto Alegre, Brazil) supports full shortcut-driven keyboard navigation.

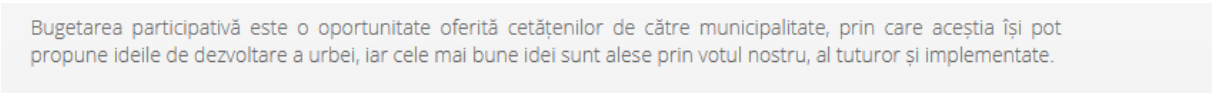[11] Council of the European Union (03/31/2009).
[12] European Parliament (10/26/2016).
[13] Dungga, A./Weissenfeld, K./Klein, E. (2019).

3.5.2 Supporting the Visually Impaired

The varieties of visual impairments are manifold, ranging from a light limitation like the missing ability to sense color to complete blindness. This diversity also motivates a variety of requirements. We assessed a total of four different items for different levels of visual impairments.

To enable easy readability, especially for users with a slight visual impairment, we checked whether the PB-websites have sections that provide a low contrast, for example, due to poor color choice or small font sizes. One of the municipalities (Oradea, Romania) uses a low-contrast design, which can make it difficult to read (Example in Figure 5).

Figure 5: Example of a Hard to Read Text Due to Low Contrast in Colors
Note: Grey Text on a Light-Grey Background

Two PB-initiatives provide images with text that is too small to read in the context of the website (9 Communes, France & Kauniainen, Finland). Two websites are already conforming to the Web Content Accessibility Guidelines (WCAG) standard that predefines a minimum level of contrast. The rest of the PB-initiatives provides a sufficient contrast without explicitly confirming a predefined standard.

Another design decision that makes the website more accessible is providing visual feedback not only through colors but also through other design elements. Examples of these design elements are icons or underscores. Colorblind users might otherwise be limited in their use of the web-page, as they have problems recognising the website's current state. As an example, in Figure 6, the clicked element "Patti di collaborazione" is underscored; the selected item can be identified without relying on colors.
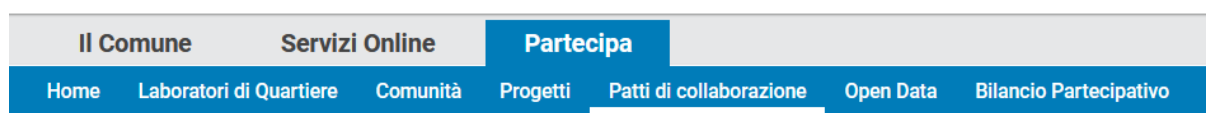

Figure 6: Navigation-Bar with Visual Feedback Through Color and Underscored Text (Bologna, [IT])

All assessed cities provide some form of extended visual feedback for better readability. Five cites also provide a high-contrast mode (see Cluj-Napoca, Romania or Jena, Germany). This functionality can further increase accessibility for visually impaired citizens.

Fully blind users cannot cope with a high contrast design – these users are dependent on either a text-to-speech engine or a braille interface. While the market offers software and specialized hardware that translates the textual content into braille to speech, these tools cannot describe pictures. We, therefore, assessed whether a user can understand the PB-websites without the consideration of images. In this regard, all cities either used just photos as side information or applied a meaningful alternative text.

4 Closing Remarks

This report assessed the websites of various PB-initiatives regarding usability and accessibility criteria. While we were able to discover shortcomings in some PB-initiative, we can state that the current PB-initiatives' usability is consistently high. Also, all PB-initiatives provide sufficient accessibility for the e-inclusion of impaired users. Some of the websites implement exemplary measures regarding the latter, like Cluj-Napoca in Romania, with a dedicated menu for toggling accessibility-related options, or Arkhangelsk in Russia with a dedicated high contrast black and white version that also reduced the content to the most necessary elements.

References

Bühler, P./Schlaich, P./Sinner, D. (2017): Webdesign, Berlin, Heidelberg 2017.

(03/31/2009): Council Conclusions on accessible information society - 2935th TRANSPORT, TELECOMMUNICATIONS, and ENERGY Council meetings, Brussels 03/31/2009.

(10/26/2016): Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies - EUR-Lex - 32016L2102 -, 10/26/2016.

Dungga, A./Weissenfeld, K./Klein, E. (2019): Barrierefreies E-Government, in: Stember, J./Eixelsberger, W./Neuroni, A./Spichiger, A./Habbel, F.-R./Wundara, M. (Hrsg.): Handbuch E-Government, Wiesbaden 2019, pp. 1-20.

Ertel, A./Laborenz, K. (2017): Responsive Webdesign - Konzepte, Techniken, Praxisbeispiele, 3. Edition, Bonn 2017.

Huang, Z./Benyoucef, M. (2014): Usability and credibility of e-government websites, Government Information Quarterly, Vol. 31, Issue 4/2014, pp. 584-595.

ISO (2018): Ergonomics of human-system interaction - Part 11: Usability: Definitions and concepts, 1. Edition, Berlin, Wien, Zurich 2018.

Kalbach, J. (2008): Handbuch der Webnavigation, Köln 2008.

Omar, A./Weerakkody, V./Sivarajah, U. (2017): Developing Criteria for Evaluating a Multi-channel Digitally Enabled Participatory Budgeting Platform, in: Parycek, P./Charalabidis, Y./Chugunov, A.V./Panagiotopoulos, P./Pardo, T.A./Sæbø, Ø./Tambouris, E. (Hrsg.): Electronic Participation, Vol. 10429, Cham 2017, pp. 3-11.

Richter, M./Flückiger, M. (2016): Usability und UX kompakt, Berlin, Heidelberg 2016.

Statista (07/04/2020): Forecast of the mobile internet user penetration rate in the United Kingdom (UK) from 2015 to 2025, URL: statista.com (Accessed: 12.11.2020).

Statista (07/14/2020): Forecast of the mobile internet user penetration rate in Germany from 2015 to 2025, URL: statista.com (Accessed: 12.11.2020).

Statista (10/08/2020): Forecast of the mobile internet penetration in France from 2010 to 2025, URL: statista.com (Accessed: 12.11.2020).