EICIDR: method for ergonomic inspection checklist in institutional digital repositories

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ABSTRACT

Context: digital repositories are informational environments for managing and controlling the scientific and academic production of institutions and/or communities; Gap: however, they can present gaps such as navigation flaws, low usability and accessibility, limited searches, little disclosure of the environment and little or no use of customizable services; Purpose: from this context, an ergonomic evaluation of institutional digital repositories becomes necessary; Methodology – an integrative review of the literature was carried out to evaluate the state of the art of usability techniques applied to the ergonomics of institutional digital repositories and to support the methods applied in this work, the file of the included articles helped in the choice of the usability evaluation method, selection of a set of requirements for usability inspection in institutional digital repositories; Final considerations: the integrative literature review strategy in the databases used and used descriptors showed that the tests applied improve the usability of digital repositories. During this study, it was observed the lack of a checklist focused on ergonomic specifications and recommendations to evaluate the ergonomics and usability of institutional digital repositories. To fill this gap, an ergonomic inspection checklist was proposed for these digital repositories.

Keywords: ergonomics; cognitive ergonomics; mental workload; usability.

INTRODUCTION

Institutional Digital Repositories (IDRs) are informational tools applied to the management of scientific knowledge, to enhance the conduct of processes, create, share and disseminate knowledge (Fachin *et al*., 2009; Leite; Costa, 2006).

Academic institutions use IDRs to support and manage scientific information, mainly from research and teaching activities. They improve the institution's internal and external communication; maximize accessibility, the visibility and impact of its scientific production; feed back into the research activity and support teaching and learning processes; they ensure free access and reduced publication costs (Camargo; Vidotti, 2008).

Ergonomics seeks to reduce or eliminate occupational health risks and also improve working conditions in order to avoid increased fatigue for users caused by the high overall workload in its various dimensions: physical, psychological and cognitive loads. (Cybis; Betiol; Faust, 2010).

Cognitive ergonomics emerged from the expansion of the study of ergonomics, as a result of the widespread use of computers, to analyze the mental capacity that enables people to produce, retrieve and understand information generated by digital information and communication technologies (DICT), (Cybis; Betiol; Faust, 2010; Soares, 2015).

User interaction with the system is made through the interface, which allows its use in different tasks, and its usability is considered a critical factor in the success and acceptance of the product by its users (Coleti, 2014; Gamez, 2004).

The usability of an interface is linked to the system's ability to interact with users, meeting their needs (Lima; Souza; Dias, 2012). It is considered a quality requirement for software, necessary and required to achieve the quality of a computational system and allows it to be usable and easy to learn (Nielsen, 1994).

An interface with good usability ensures that devices and systems are adapted to the way users think, behave and work (Cybis; Betiol; Faust, 2010; Freire, 2022; Gamez, 2004; Lima, 2021; Moraes; Gonçalves, 2021; Souza, 2022).

For Nielsen and Loranger (2006), usability is related to five system attributes: being easy to learn, efficient to use, easy to remember and pleasant to use, in addition to being subject to few errors and linked to the system's capacity of interacting with users, meeting their needs, and is related to: ease of learning, effectiveness, attitude, flexibility, perceived usefulness of the product, suitability for the task, task characteristics and user characteristics.

Thus, an interface with good usability prevents users from having to learn complex procedures, helps them memorize activities in the system, guides the exploration of its content, protects against errors and facilitates procedures, and reduces the physical and mental burden on users, in addition to reducing the time spent to perform a task (Cybis; Betiol; Faust, 2010; Freire, 2022; Lima, 2021; Moraes; Gonçalves, 2021; Souza, 2022).

To build an IDR, navigation, architecture, content creation, page production, accessibility, usability and ergonomic requirements must be taken into account (Camargo; Vidotti, 2008; Ferreira, 2007; Rodrigues *et al*., 2004; Rogers; Preece; Sharp, 2013; Santos; Flores, 2015; Sayão, 2011; Scapin; Bastien, 1997; Soares, 2015; Winckler; Pimenta, 2002).

It is considered that: a high degree of usability of an interface is reflected in users performing tasks with ease, speed and satisfaction (Afonso; Lima; Cota, 2012; Cybis; Betiol; Faust, 2010; Freire, 2022; Gamez, 2004; Lima, 2021; Moraes; Gonçalves, 2021; Nielsen, 1994; Scapin; Bastien, 1997; Souza, 2022).

Studies conducted in IDRs show that they can present gaps, such as navigation flaws, low usability, limited searches, little disclosure of the environment and little or no use of customizable services (Bohmerwald, 2005; Camargo; Vidotti, 2008; Ferreira, 2007; Sales; Bezerra; Pereira, 2013; Santos; Flores, 2015; Sayão, 2011; Veiga *et al*., 2013).

In this context, these must be assessed regarding ergonomics and usability to provide effective interaction between users, available material and its interface (Afonso; Lima; Cota, 2012; Santos, 2018, Santos; Gamez; Mancini, 2015, 2016a, 2016b, 2016c, 2017, 2019; Soares, 2015).

Over the course of this study, the existence of a checklist focused on ergonomic specifications and recommendations to assess the ergonomics and usability of IDRs was not observed in the consulted literature. Only questionnaires were found focusing on users' degree of acceptance or not of the interface (Bohmerwald, 2005; Camargo; Vidotti, 2008; Ferreira, 2007; Freire, 2022; Lima, 2021; Moraes; Gonçalves, 2021; Oliveira, 2001; Rodrigues *et al.*, 2004; Sales; Bezerra; Pereira, 2013; Santos, 2018; Santos; Flores, 2015; Santos; Gamez; Mancini, 2015, 2016a, 2016b, 2016c, 2017, 2019; Sayão, 2011; Souza, 2022; Veiga *et al*., 2013).

To fill this gap, the aim of this work was to propose a Checklist for Ergonomic Inspection of Institutional Digital Repositories (CEIIDR), composed of a set of requirements, heuristics, guidelines and severity ratings based on the heuristics of Nielsen and his collaborators, as well as their guidelines for Content Creation, Page Production, Navigational Design, Architectural Design and Interface Design (Carvalho; Anacleto, 2002; Nielsen, 1994; Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

MATERIAL AND METHODS

To achieve the aim of this work, the following steps were followed: Integrative Literature Review (ILR) to investigate the state of the art of usability techniques applied to the ergonomics of IDRs; choice of the usability evaluation method and the selection of a set of requirements for inspection of its usability, the classification of the set of requirements for usability inspection of IDRs, the assignment of the expected response, the respective heuristics, guideline and severity rating for each requirement and, compiled, gave rise to the CEIIDR: checklist of ergonomic inspection in IDRs.

1) ILR

ILR was chosen because this type of review provides a broad analysis of the literature, contributes to discussions about research methods and results, as well as reflections on conducting future studies. The initial purpose of this research method is to obtain a deep understanding of a given phenomenon based on previous studies, it allows the combination of data from empirical and theoretical literature that can be directed to defining concepts, identifying gaps in the areas of study, review of theories and methodological analysis of studies on a given subject (Mendes; Silveira; Galvão, 2008).

Search string

The *ILR search string* was based on the terms in the research question: usability, cognitive ergonomics and IDRs. The research process consisted of an automatic search, *via the CAPES/MEC Journals Portal*[1] using *the* Virtual Private Network *(VPN) of* Unifesp*,* on Web of Science as this database indexes more than 12,000 high-profile journals worldwide, including journals such as those of the Association for Computing Machinery (ACM) Digital Library or those of the Institute of Electrical and Electronics Engineers(IEEE). The research was conducted on 09/26/2016 (Santos, 2018).

The searches were carried out based on pre-defined criteria (**Table 1** and **Table 2**).

Table 1 – Databases and search string

Database	Search String
CAPES/MEC Journals Portal	#1 USABILIDADE OR USABILITY OR (ERGONOMIA COGNITIVA) OR (COGNITIVE ERGONOMICS) OR (AVALIAÇÃO ERGONÔMICA) OR (ERGONOMIC EVALUATION) #2 (MÉTODOS DE AVALIAÇÃO) OR (EVALUATION METHODS) OR (EVALUATION) OR (METHOD*) OR (MÉTODO) #3 (REPOSIT* DIGITA*) OR (REPOSIT* INSTITUTIONAL*) OR (REPOSIT* DIGIT* INSTITUTIONAL*) OR (REPOSIT*) #4 #1 AND #2 AND #3
Association for Computing Machinery (ACM)	
Institute of Electrical and Electronics Engineers (IEEE).	

Source: Prepared by the authors using Software Zotero[2] (2022).

1 http://www.periodicos.capes.gov.br/

2 Free software *Zotero* was used to manage references resulting from the search in the Indexed Databases.

Table 2 – Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
(1) articles containing techniques and/or methods for ergonomic evaluation of the usability of IDRs; **(2) descriptive articles relating usability evaluation with applications in DRs and/or IDRs.**	(1) articles that are not written in Portuguese or English; (2) similar articles with duplicate results in different databases; (3) incomplete articles (summary only, tutorials, whitepapers or keynotes); (4) book chapters; (5) articles not containing any application related to the context of usability in DRs and IDRs.

Source: Prepared by the authors using Software Zotero (2022).

2) Creation of CEIIDR

Literature used in the creation of CEIIDR

The literature used in the creation of CEIIDR was: Nielsen (1994), Nielsen and Loranger (2006), Nielsen and Tahir (2012) and the Nielsen (1994) guidelines for systems development, compiled by Carvalho and Anacleto (2002) as ILR cited these authors as experts on subject usability.

Choice of the usability evaluation method

Usability inspection using a checklist was chosen because it can be applied by any interface user without the need for expertise on the subject (Nielsen, 1994; Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Creation of requirements for evaluating the usability of IDRs

The creation of requirements for evaluating the usability of IDRs arose from the selection of the Nielsen (1994) guidelines for systems development, compiled by Carvalho and Anacleto (2002). Guidelines related to e-commerce websites were excluded. These requirements were structured in a table containing questions about usability in IDRs (Carvalho; Anacleto, 2002; Nielsen, 1994).

Expected response

Based on the literature of Nielsen (1994), Nielsen and Loranger (2006), Nielsen and Tahir (2012) and the Nielsen (1994) guidelines for systems development, compiled by Carvalho and Anacleto (2002), each requirement was assigned an expected answer (Yes/No).

Assignment of heuristics

For each requirement, the respective heuristic was assigned based on the 10 heuristics refined by Nielsen (1994) and studies on usability problems carried out together with Carvalho and Anacleto (2002), and they are:

1. Visibility of system status.
2. Correspondence between the system and the real world.
3. User control and freedom.
4. Consistency and standards.
5. Error prevention.
6. Helps users recognize, diagnose, and recover from errors.
7. Recognition rather than recall.
8. Flexibility and efficiency of use.
9. Aesthetic and minimalist design.
10. Help and documentation.

Guidelines

Each usability requirement was classified according to the guidelines for Content Creation, Page Production, Navigational Design, Architectural Design and Interface Design (Carvalho; Anacleto, 2002; Nielsen, 1994).

Severity rating

According to Nielsen (1994), severity ratings are classified on a scale of 0 to 4, and are:

0. I don't agree that this is a usability problem at all.
1. Cosmetic problem only: need not be fixed unless extra time is available on project.
2. Minor usability problem: fixing this should be given low priority.
3. Major usability problem: important to fix, so should be given high priority.
4. Usability catastrophe: imperative to fix this before product can be released.

Each requirement was classified according to the severity rating from 0 to 4 which, in ascending order, represented an increase in the compromise of usability in IDR, as well as in the speed of resolving the breach of the requirement in CEIIDR. We can say that severity rating zero (0) means that the problem encountered is not related to usability. For severity

rating one (1), the issue concerns the appearance of the page(s), which means it needs to be fixed only if extra time is available. Severity rating two (2) corresponds to a minor usability problem and should be given low priority to be resolved. Severity rating three (3) means that there is a major usability problem, it is important to solve it as should be given high priority. Severity rating four (4) represents a serious compromise in usability and it is imperative to fix this before the website is launched, or as quickly as possible because its compromise is critical for both the IDR and the user when referring to the expected and obtained results.

Compilation of data and requirements

CEIIDR – *Checklist* for Ergonomic Inspection of Institutional Digital Repositories was then created for the usability inspection test, composed of a set of requirements, heuristics, guidelines, their severity rating and expected response (Carvalho; Anacleto, 2002; Nielsen, 1994; Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

CEIIDR is presented in Appendix A.

RESULT ANALYSIS AND DISCUSSION

IRL showed that the models, methods and techniques used for usability evaluation are: testing interaction scenarios with tasks and inspection testing using a checklist.

The registration of all articles included in the ILR was decisive for choosing the usability evaluation method and selecting a set of requirements for usability inspection in IDRs based on the heuristics of Nielsen and his collaborators, as well as their guidelines for Content Creation, Page Production, Navigational Design, Architectural Design and Interface Design (Santos, 2018).

The authors, books and articles identified in reading the articles proved to be relevant for choosing the selected usability evaluation method and a set of requirements for usability inspection in IDRs (Carvalho; Anacleto, 2002; Nielsen, 1994; Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

According to Nielsen (1994), when opening a page on the Web , users first look at the main area, looking for titles and other indications of the page's content (Nielsen, 1994). This can be justified by the fact that reading on a screen is tiring for the eyes and slower (studies show that reading on a screen is 25% slower than reading printed texts (Anacleto; Villena, 2009).

Therefore, one must be cautious when creating content that will be presented, which needs to be easily viewed and understood by users (Anacleto; Villena, 2009).

Below are some guidelines that help create content: be succinct, avoid redundant content and long paragraphs, excessive itemization, exclamation points, spaces and punctuation for emphasis. Subheadings and lists should be used, as well as hypertext to divide long

information, pay attention to spelling, be careful with humor, do not use icons that show users gestures that could be offensive in their culture, nor use visual wordplay. A figure can contain different meanings in different cultures (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Furthermore, information from the repository, such as “About Us”, “Presentation”, “Policy”, “Privacy Policy” should not be grouped into a single reserved area, nor should it include internal information that must remain on the intranet. It is recommended that label sections and categories be used with user-centered language, according to the importance of these sections and categories to the user (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Capital letters should rarely be used together and never as a formatting style. Studies show that text in all capital letters is less readable than text in mixed case letters. Also, use month full names or their abbreviations, but not numbers (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

After having decided what information the page should include, one must plan how to present it; thus, the Page Production Guidelines direct the arrangement of information on the page (Anacleto; Villena, 2009; Nielsen, 1994).

The way information is organized on a page can make a difference between it communicating an appropriate message or demanding a high mental load from users (Nielsen; Tahir, 2012).

Users read a page on the Web in the same way as they read other types of information, that is, by grouping it spatially. For this reason, it is important that the layout conditions be respected. In Western countries, this means left to right and top to bottom. The most important information should be located in the top left corner of the page (Nielsen, 1994).

The layout is the way in which information items are arranged in a composition; they need to be consistent throughout all the pages on the website. In general, they should clearly define functional zones; they must be balanced in how the clear areas of the screens are used and must not have any object alignment issues. Layout plays an important role on a webpage, influencing the way users feel and understand information (Oliveira, 2001).

Therefore, it is recommended, among the Page Production guidelines, that the institution’s logo is located on the top left corner of the homepage and appears on all pages, and that the external logos are small and as discreet as possible in relation to the core content of the homepage and to the institutional logo (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Hypertexts must be productive, respect paragraphing, contain a reduced number of graphic elements, avoid watermark graphics, not use animation for the sole purpose of drawing attention to an item on the homepage (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Critical page elements, such as logos, taglines or the main title, should not be animated (Nielsen; Tahir, 2012).

Cybis (2010) recommends some caution when using background colors and textures in texts, in order to ensure readability: the search for textures with elements on very small scales; the search for textures in which the contrast between the colors and tones of its elements is reduced; not using reliefs with too many colors and tones. The use of neutral

colors for page backgrounds increases the readability of informative text and speeds up data transmission. Dark colors and textures can be used to direct user attention on a webpage. However, they should only be used in small areas, as using them across the entire length of the page increases visual fatigue (Cybis; Betiol; Faust, 2010).

Literature recommendations are for contrast in using colors, chromatic colors (blue, green, red, etc.) on an achromatic background (white, black and gray) or vice versa (Cybis; Betiol; Faust, 2010; Nielsen; Tahir, 2012).

The webpage must include a scroll bar with up and down arrows, a scroll indicator, avoiding horizontal scrolling at 800x600. The main elements of the webpage must be visible "above the fold" (on the first screen of the content, with no need for scrolling), the size of the most predominant window (Nielsen; Tahir, 2012).

Navigation is what allows users to carry out their tasks, not delaying or even preventing the execution of the tasks intended by the user (Anacleto; Villena, 2009; Nielsen, 1994).

Nielsen and Loranger (2006) say that navigation will be fully resolved when users can answer three basic questions: Where am I? Where have I been? Where can I go? Considering the IDR user, navigation must then show them their location, the path taken and the route responsibilities to the desired content (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Thus, a website must provide a dynamic site map, which indicates the page accessed and has ways to highlight information of interest to specific user populations, it must have a "Statistics" option, work equally in browsers Explorer, Mozilla , Opera and Google, use the browser's "back" arrow instead of a link for this purpose. However, these authors further state that, in most tests conducted with users, they frequently use the browser's "back" button, although there is a direct link to the location they wish to return to. The "back" button is always available, it is always in the same location and it always works the same way, retracing one step at a time. The strong consistency of the interface means that people don't need to look for a link on the page: they immediately know where to go. Finally, it is understood that the browser's "back" button is used more than a common link (Nielsen, 1994).

Nielsen and Loranger (2006) consider that opening new windows has bad effects: it interrupts the experience expected by the user; pollutes the user's screen with unwanted objects (sometimes causing crashes or memory errors); prevents the user's ability to return to visited pages and covers the window on which the user is currently working (Nielsen; Loranger, 2006). However, there is an exception, and it regards Adobe PDFfiles. In these types of documents, users often go directly to the window close box. Therefore, if the file opens in the same window and the user uses the close box, the webpage will consequently close. They state that the best guidelines for creating links to non- Web documents are: open non- Web documents in a new browser window; alert users in advance that a new window will appear; remove browser tools (such as the "back" button) from the new window; above all, the browser must be prevented from opening the document (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

The page must not make the same link available in different locations on the website , or have different links, but with the same function. The link of the title selected must be highlighted and underlined. Nielsen and Loranger (2006, p. 61)[3] add: “Não alterar as cores dos *link*s cria confusão navegacional”. It is understood that this requirement has the purpose of showing users the items they have already searched for and so that they do not select them again by mistake (Nielsen; Loranger, 2006).

Furthermore, the homepage must include an input box to enter search queries, instead of only providing a link to a search page, which must be color white, positioned in the same location on all pages, on the left side or center, taking advantage of the user experience on other websites. The area needs to be clear, leading the eye to this field and include the magnifying glass symbol to the right of the box, enabling spell checks, both for the search input data and for terms in the consulted documents (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

Nielsen and Loranger (2006, p. 54) mention that “Uma caixa de busca simples e padrão deve ser posicionada em um lugar padrão em todas as páginas [...]”[4]. The authors clarify that larger search boxes are better for two reasons. First, they encourage users to type longer queries, which typically leads to more accurate and useful results. Second, there are fewer typos and other errors when users can see everything they type (Nielsen; Loranger, 2006).

Nielsen and Tahir (2012, p. 75)[5] emphasize that “Além do texto colorido, o sublinhado é a segunda mais importante indicação para os usuários de que o texto é clicável [...]”. With regard to text and background colors, the authors found in their research that the white background is the most recommended and should be followed by most projects as it achieves the highest contrast and greatest readability. They also mention that texts in black are the most recommended, and the color blue is widely used in links (Nielsen; Tahir, 2012).

The Architectural Design is intrinsically related to the good use of the website and to navigational ease, and users can discern what is a priority and what is secondary on the website. This way, the information must be structured and well located; in order to show the structure of the website , it must include link “Site map”, be organized by the tasks that users wish to carry out on the website, reflect the users’ view of the website and its information and services. It is advisable to give essential task items a prominent place, as seen on the repository homepage (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

The “Site map” groups a large amount of information into a single overview. This feature must employ adequate technical writing to generate efficient and useful content. They recommend making a “Help” feature available on the top right corner of the webpage (Nielsen; Tahir, 2012).

3 Translation: “Not changing the colors of the links creates navigational confusion” (Nielsen; Loranger, 2006, p. 61, editorial translation).
4 Translation: “A simple, standard search box should be positioned in the same location on all pages [...]” (Nielsen; Loranger, 2006, p. 54, editorial translation).
5 Translation: “In addition to colored text, underlining is the second most important indication to users that the text is clickable [...]” (Nielsen; Tahir, 2012, p. 75, editorial translation).

The interface is the part of the system that is in contact with users directly, requirements for the Interface Design are: contain option “change the text size to large” (“A+” and “A-”) to allow accessibility by visually impaired users, as it results in better readability (Nielsen; Loranger, 2006).

The interface must include the name of the languages in said language (for example, use the word “English” as an anchor for the website translated into English) and avoid using a flag to indicate that the website is translated, as one country can have several languages, just as one language can be spoken in several countries (Nielsen; Tahir, 2012).

It is indispensable for the name and/or logo to be displayed on the homepage (not clickable); it does not need to be large, but it must be larger and more important than the items around it so that it attracts user attention. On other pages, the logo must be clickable and link to the homepage (Nielsen; Loranger, 2006).

The *homepage* must also be structured differently from all other existing pages on the website and emphasize the highest priority tasks so that users have a defined starting point on the homepage. Drop-down menus are not recommended, especially if the items contained in such menus are not self-explanatory (Nielsen; Tahir, 2012).

The interface must not include generic links for user community support, chats or other discussion resources; avoid the use of pop-up windows (Nielsen; Loranger, 2006; Nielsen; Tahir, 2012).

It is important that the login option is easy to view, as well as the option to create a profile and explain the advantages of user sign-up (Nielsen; Loranger, 2006).

Appendix A presents the CEIIDR created for IDR evaluation, composed of a set of requirements, heuristics, guidelines and their severity rating based on the heuristics of Nielsen and his collaborators, as well as their guidelines for Content Creation, Page Production, Navigational Design, Architectural Design and Interface Design (Anacleto; Villena, 2009).

FINAL CONSIDERATIONS

ILR showed the state of the art of techniques applied to usability and led to the creation of CEIIDR.

The CEIIDR proposal filled the existing gaps for the evaluation of usability by means of inspection testing and emerged from the ILR and the registration of the articles included in it. In these stages, a gap was identified in the existence of a checklist focusing on inspection testing in IDRs. The ILR and the registration allowed the selection of the method and the set of requirements for usability inspection in IDRs based on the heuristics of Nielsen and his collaborators, and their guidelines for Content Creation, Page Production, Navigational Design, Architectural Design and Interface Design.

The main contributions presented in this work are as follows:

- The creation of a Checklist for Ergonomic Inspection of Institutional Digital Repositories – CEIIDR;

- The possibility of applying CEIIDR to IDRs;
- The search for improving the usability of IDRs;
- Identification of points of suitability and inadequacy of usability in IDRs;
- Reducing the cognitive load of IDR interface users.

Implications for research can be suggested for the future, such as the validation of the usability evaluation *checklist,* application of the inspection test in IDRs, the creation of a manual with guidelines for inspection test application.

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APPENDIX A

Requirements		Heuristics	Guideline	Severity Rating	Expected response
1	Display the IDR name and/or logo on homepage	7	Interface Design	1	Yes
2	The IDR name and/or logo is located on the top left corner of homepage	7	Page Production	1	Yes
3	Logo is available on all IDR pages	7	Page Production	1	Yes
4	Logo is clickable and links to IDR homepage	7	Navigational Design	1	Yes
5	Logo is clickable on IDR homepage (active link to homepage on homepage)	5	Interface Design	2	No
6	There is a tagline (explanatory note) explicitly summarizing what IDR does	9	Interface Design	1	Yes
7	IDR displays University clickable logo in a smaller size than its own and links to respective page	9	Content Creation	1	Yes
8	IDR pages maintain the external logos on the right side	9	Page Production	2	Yes
9	IDR pages keep external logos small and as discreet as possible in relation to the central content of homepage and IDR logo	9	Page Production	2	Yes
10	IDR has “Presentation” or “About Us” link that offers users an overview of IDR	9	Navigational Design	1	Yes
11	IDR has “Policy” link	9	Navigational Design	2	Yes
12	IDR has “Privacy Policy” link	9	Navigational Design	2	Yes
13	IDR has “Copyright” link citing current legislation	9	Navigational Design	1	Yes
14	IDR has safety certificate	9	Navigational Design	2	Yes
15	IDR has a “contact us” or “get in touch” option with all the contact information from the repository	9	Navigational Design	2	Yes
16	The “contact us” or “get in touch” option works	9	Navigational Design	2	Yes
17	IDR shows website structure , has a “Site map” link	1	Architectural Design	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
18	IDR has a dynamic site map that indicates the page from which it was accessed and has ways to highlight information of interest to specific user populations	1	Navigational Design	2	Yes
19	IDR has “Statistics” option	1	Navigational Design	2	Yes
20	IDR has “Help” link	10	Navigational Design	3	Yes
21	IDR content groups repository information such as About Us, Presentation, Policy, Privacy Policy in one reserved area	7	Content Creation	2	Yes
22	IDR homepage clearly informs consistency of available information	4	Content Creation	2	Yes
23	IDR makes structure visible and how IDR is organized	4	Page Production	2	Yes
24	IDR has permanent links	9	Page Production	1	Yes
25	IDR works equally well in Explorer, Mozilla, Opera and Google browsers	1	Navigational Design	3	Yes
26	IDR uses browser “back” arrow instead of link intended for this purpose	3	Navigational Design	2	Yes
27	IDR emphasizes the highest priority tasks so users have a defined starting point on homepage	3	Interface Design	2	Yes
28	IDR does not use word “website” to refer to any other aspect	9	Interface Design	1	Yes
29	IDR structures its homepage differently from all other pages on the website	9	Interface Design	1	Yes
30	IDR avoids using multiple text input boxes on homepage, particularly at the top of the page where people typically look for the search feature	9	Interface Design	1	Yes
31	IDR rarely uses drop-down menus, especially if the items contained in such menus are not self-explanatory	9	Interface Design	1	Yes
32	IDR does not provide generic links for user community support, chats or other discussion resources	9	Interface Design	1	Yes
33	IDR does not offer a “Guest Book” entry as it makes them look like amateurs	9	Interface Design	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
34	IDR includes the name of languages in said language (for example, using the word “English” as an anchor for the website translated into English)	9	Interface Design	1	Yes
35	The IDR avoids using a flag to indicate that the website is translated, as one country can have several languages, just as one language can be spoken in several countries	9	Interface Design	1	Yes
36	IDR prevents pop-up windows	9	Interface Design	1	Yes
37	IDR has “change text size to large” (“A+” and “A-“) option	3	Interface Design	2	Yes
38	IDR has login option	9	Interface Design	2	Yes
39	In IDR, the login option is easily visualized	9	Interface Design	2	Yes
40	IDR has a profile creation option	9	Interface Design	2	Yes
41	IDR explains (or, at least, mentions) Sign up and Profile creation advantages	9	Interface Design	2	Yes
42	IDR does not explain the benefits and publication frequency to users before asking for their email addresses	9	Interface Design	2	Yes
43	IDR is organized by the tasks users wish to perform on the website	4	Architectural Design	1	Yes
44	IDR reflects users’ view of the website and its information and services	4	Architectural Design	1	Yes
45	IDR’s homepage “welcomes” users to website	4	Architectural Design	1	No
46	IDR clearly informs on homepage if website freezes or important parts of website are not working	5	Architectural Design	1	Yes
47	IDR content is succinct	9	Content Creation	1	Yes
48	IDR content is written in easily-readable manner and avoids long paragraphs	9	Content Creation	1	Yes
49	IDR content uses subheadings and lists	9	Content Creation	1	Yes
50	IDR content uses hypertext to break up long sentences	9	Content Creation	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
51	IDR content is attentive to spelling	9	Content Creation	1	Yes
52	IDR content includes a summary of the material	9	Content Creation	1	Yes
53	IDR content is attentive to humor	9	Content Creation	1	Yes
54	IDR content does not include internal repository information (intended for employees, which must remain on intranet) on the public website	9	Content Creation	1	Yes
55	IDR homepage answers questions like “where am I?”, “what does this website do?” and “where can I go?”	1	Navigational Design	1	Yes
56	IDR content uses label sections and categories, with user-centric language according to the importance of those sections and categories for the user and not for IDR	2	Content Creation	1	Yes
57	IDR content does not use erudite sentences or marketing dialect so that people don’t need to struggle to understand what is being said	9	Content Creation	1	Yes
58	IDR content employs capitalization and other style standards consistently	9	Content Creation	1	Yes
59	IDR does not label a clearly defined area of the page if the content is sufficiently self-explanatory	9	Content Creation	1	Yes
60	IDR content avoids excessive itemization (lists with a single item)	9	Content Creation	1	Yes
61	IDR content uses non-separable spaces between words that need to remain together to be seen and understood in sentences	9	Content Creation	1	Yes
62	IDR content uses only imperative speech, such as “Enter a City or ZIP Code” in mandatory tasks, or qualifies the statement appropriately	9	Content Creation	1	Yes
63	IDR content explains the meaning of abbreviations, capital letters, acronyms and immediately follows them with the abbreviations, in the first occurrence	9	Content Creation	1	Yes
64	IDR content avoids exclamation points	9	Content Creation	1	Yes
65	IDR content rarely uses all capital letters and never as a formatting style	9	Content Creation	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
66	IDR content avoids inappropriate use of spaces and punctuation for emphasis	9	Content Creation	1	Yes
67	IDR content presents succinct but descriptive titles to convey as much information as possible in as few words as possible	9	Content Creation	1	Yes
68	IDR does not provide users with features to customize the basic appearance of homepage interface	3	Content Creation	1	Yes
69	IDR does not use icons that show users gestures that are offensive in their culture	9	Content Creation	1	Yes
70	IDR content does not use visual wordplay. A figure may have different meanings in different cultures	4	Content Creation	1	Yes
71	IDR content does not employ metaphors outside the information domain of website	4	Content Creation	1	Yes
72	IDR content uses full month name or abbreviations, but not numbers.	4	Content Creation	1	Yes
73	IDR pages produce productive hypertext	9	Page Production	1	Yes
74	IDR pages respect paragraphing	9	Page Production	1	Yes
75	On IDR pages, the number of graphic elements is reduced	9	Page Production	1	Yes
76	IDR pages avoid watermark graphics (background images with overlaid text)	9	Page Production	1	Yes
77	IDR pages do not use animation for the sole purpose of drawing attention to an item on homepage	9	Page Production	1	Yes
78	IDR pages never animate critical page elements such as logos, taglines or main titles	9	Page Production	1	Yes
79	IDR pages limit font styles and other text formatting attributes such as sizes and colors	9	Page Production	1	Yes
80	IDR pages use high-contrast text and background colors so that characters are as legible as possible	9	Page Production	1	Yes
81	IDR pages use fonts large enough to read	9	Page Production	1	Yes
82	IDR page background is white	9	Page Production	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
83	IDR has a scroll bar, up and down arrows and a scroll indicator	9	Page Production	1	Yes
84	IDR pages prevent horizontal scrolling at 800x600	9	Page Production	1	Yes
85	On IDR pages, the most critical elements of the page are visible “above the fold” (on the first screen of content, without scrolling), in the most predominant window size	9	Page Production	1	Yes
86	IDR pages use a fluid layout to allow adjustment of homepage size to various screen resolutions	9	Page Production	1	Yes
87	IDR does not include top-level domain name, such as “.br”, in window title bar	9	Page Production	1	Yes
88	IDR does not include the word “ Homepage” in the title	9	Page Production	1	Yes
89	IDR pages limit window titles to no more than seven or eight words and fewer than 64 characters	9	Page Production	1	Yes
90	IDR pages select words with high informational content with hypertext anchors	9	Page Production	1	Yes
91	IDR makes clear from the start the scope of the niche it wishes to serve	9	Page Production	1	Yes
92	IDR provides easy-to-use documentation	10	Page Production	1	Yes
93	IDR avoids internal links	9	Navigational Design	1	Yes
94	IDR makes it easy to access recently presented items on homepage, such as the last two weeks or the previous month, by providing a list of the latest presentations	9	Navigational Design	1	Yes
95	IDR does not use deep links	9	Navigational Design	1	Yes
96	In IDR, structural links are standard throughout website	9	Navigational Design	1	Yes
97	IDR supports user-controlled navigation	9	Navigational Design	1	Yes
98	IDR does not use generic instructions such as “click here” as the name of a link	9	Navigational Design	1	Yes
99	IDR does not use generic links such as “More...”, at the end of a list of items	9	Navigational Design	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
100	IDR does not use the word “ Links ” to indicate existing links on page	9	Navigational Design	1	Yes
101	IDR groups items in the navigation area so that similar items are close to each other	9	Navigational Design	1	Yes
102	IDR does not make up terms for category navigation options. Categories are differentiable from each other. If users do not understand the made-up terminology, they will not be able to distinguish categories	9	Navigational Design	1	Yes
103	IDR provides feedback mechanism, specifies the purpose of link, and other pertinent information	1	Page Production	1	Yes
104	IDR provides input box on homepage for entering search queries, rather than just providing a link to a search page	9	Navigational Design	1	Yes
105	IDR search box is white	9	Navigational Design	1	Yes
106	IDR search box is positioned on the same location on all pages	9	Navigational Design	1	Yes
107	IDR search box positioning is on the left or center, taking advantage of user experience on other websites, and the area is clear, leading user attention to this field	9	Navigational Design	1	Yes
108	Search box is not large enough for users to see and edit standard queries on website	9	Navigational Design	1	Yes
109	In the search bar with title, the word “Search” is used and not the magnifying glass symbol to the right of the box	9	Navigational Design	1	Yes
110	IDR does not perform spelling checks for both the search input data and terms in the consulted documents	9	Navigational Design	1	Yes
111	IDR does not offer synonym expansion for search data	9	Navigational Design	1	Yes
112	IDR provides simple searches on homepage, with a link to access advanced search or search tips	9	Navigational Design	1	Yes
113	Search box for advanced search is large enough for users to see and edit standard queries on website	9	Navigational Design	1	Yes
114	Search box for advanced search is color white	9	Navigational Design	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
115	In IDR, the title selected for search is highlighted and underlined	7	Navigational Design	3	Yes
116	In IDR, links are highlighted and underlined	7	Navigational Design	3	Yes
117	Text on IDR pages is black	9	Navigational Design	2	Yes
118	IDR clearly indicates which links lead to follow-up information about each example and which links lead to general information about the category as a whole	5	Navigational Design	2	Yes
119	IDR does not use underlining for texts other than hypertext anchors	9	Navigational Design	2	Yes
120	IDR allows colored links to indicate visited and unvisited status	9	Navigational Design	2	Yes
121	IDR indicates the presence of blue underlined links	9	Navigational Design	2	Yes
122	IDR makes sure that the link indicates exactly what will happen if it is clicked on (indicate whether link leads to another webpage, links a PDF file to the page, activates audio and video equipment or an email messaging app, etc.)	9	Navigational Design	2	Yes
123	In IDR, the search feature on homepage must search the entire website, by default	9	Navigational Design	1	Yes
124	In IDR, when searching for a keyword that does not exist, this information is returned	5	Navigational Design	4	Yes
125	IDR does not offer a “Search the web” feature, in the website search function	9	Navigational Design	1	Yes
126	In IDR, the search result: displays the classified occurrence list with the best results at the top; eliminates repeated occurrences of the same pages; displays a small snippet of the target page, capable of describing it	9	Navigational Design	1	Yes
127	IDR has a ”Show full record” link	10	Navigational Design	1	Yes
128	In IDR, the ”Show full record” link is highlighted and underlined	7	Navigational Design	3	Yes
129	In IDR, there is a with link permanent file address	10	Navigational Design	1	Yes

Requirements		Heuristics	Guideline	Severity Rating	Expected response
130	The link with permanent file address works	5	Navigational Design	2	Yes
131	IDR has the option “most downloaded items” after the search result	10	Navigational Design	3	Yes
132	IDR pages indicate the file size and format in parentheses, after the link	10	Page Production	1	Yes
133	In IDR, the selected title file opens in the same window	9	Navigational Design	3	Yes
134	The IDR addresses the usability requirements of non-web documents	4	Navigational Design	3	Yes
135	IDR makes the same link available in different locations in the navigation area	5	Navigational Design	1	Yes
136	IDR has standardized language throughout all pages	9	Page Production	3	Yes
137	Navigation by title is in alphabetical order	9	Navigational Design	1	Yes
138	Navigation by keyword is in alphabetical order	9	Navigational Design	1	Yes
139	Navigation by author is in alphabetical order	9	Navigational Design	1	Yes
140	Navigation by date works	9	Navigational Design	1	Yes