

## Usability measures

### Learnability measures

ID	Name	Description	Measurement function	Method
Le-1-G	Easy of learning	The user easily uses the site.	$X = \sum_{i=1}^U S_i / U$ i = user identifier U = the total number of users S <sub>i</sub> = the score of the question j given by the user i	Questionnaire
Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related question can be found in Appendix A. Note 2 To answer the questionnaire, users must use the site before. Note 3 Minimum 31 users ( to meet statistical significance in accordance to Triola(1999)). Note 4 The site must be tested in different browsers (e.g., Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.				
Le-2-G	Navigation	The navigation through the web pages is consistent, it is easy to understand the paths and move from one page to another.	$X = \sum_{i=1}^U \sum_{j=1}^Q S_{ij} / (U * Q)$ i = user identifier j = question identifier U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	Questionnaire
Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix B. Note 2 To answer the questionnaire, users must use the site before. Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)). Note 4 The site must be tested in different browsers (e.g., Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.				
Le-3-G	Coherent buttons	The images or texts in the buttons correspond to the	$X = \sum_{i=1}^U S_i / U$ i = user identifier U = the total number of users	Questionnaire

		functionality they effectively execute.	$S_i$ = the score of the question j given by the user i	
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related question can be found in Appendix C.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Le-4-G	Coherent menus	The labels of menu items correspond to the functionality that they effectively execute.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier  j = question identifier  U = the total number of users  Q = the total number of questions  <math>S_{ij}</math> = the score of the question j given by the user i</p>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix D.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (e.g., Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				

### Efficiency measures

ID	Name	Description	Measurement function	Method
Ef-1-G	General flexibility	The site provides page personalization options such as the inclusion of shortcut keys.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier  j = question identifier  U = the total number of users</p>	Questionnaire

			Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix E.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Ef-2-S	Environment flexibility	The site is flexible to be used in different browsers and devices.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier j = question identifier U = the total number of users Q = the total number of questions S<sub>ij</sub> = the score of the question j given by the user i</p>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix F.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Ef-3-G	Responsive	The website can be accessed correctly not only on computers such as desktops and notebooks, but also on mobile devices.	$X = \{1,0\}$ <p>1 – it indicates the site is responsive 0 – it indicates the site isn't responsive</p>	Automatic tool
<p>Note 1 Minimum one tool. The return should indicate whether the site is ready to run on mobile devices or not.</p> <p>Note 2 For example, Mobile Friendly Test tool can be used (<a href="https://search.google.com/test/mobile-friendly">https://search.google.com/test/mobile-friendly</a>).</p>				
Ef-4-G	Performance	The website load time	$X = \frac{1}{n} \sum_{i=1}^n S_i$ <p>i = tool identifier</p>	Automatic tool

			$S_i$ = value obtained from tests with each tool $n$ = number of tools	
<p>Note 1 Minimum of 3 automatic tools. For example, PageSpeed Insights (<a href="https://developers.google.com/speed/pagespeed/insights/?hl=pt-BR">https://developers.google.com/speed/pagespeed/insights/?hl=pt-BR</a>), Pingdom Website Speed Test (<a href="https://tools.pingdom.com/">https://tools.pingdom.com/</a>), GTMetrix(<a href="https://gtmetrix.com/">https://gtmetrix.com/</a>), tools can be used.</p> <p>Note 2 Minimum of 10 tests per configuration (browser, machine, network).</p> <p>Note 3 Each tool must return a value between 0 to 100, when loading the site; values closer to 100 is better.</p> <p>Note 4 This sub attribute is the same as the one indicated as Pe-4-G.</p>				

### Safety in use measures

ID	Name	Description	Measurement function	Method
Sf-1-S	Failure handling	The site handles and treats the errors.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ $i$ = user identifier $j$ = question identifier $U$ = the total number of users $Q$ = the total number of questions $S_{ij}$ = the score of the question $j$ given by the user $i$	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix G.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (e.g., Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Sf-2-S	Rate of failures	The number of failures of the site.	$X = A/B$	Test with users

			A = Number of failures detected during observation time B = Observation duration	
<p>Note 1 The users must use the site to raise the number of failures of the site.</p> <p>Note 2 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 2 The site must be tested in different browsers (e.g., Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				

### User satisfaction measures

ID	Name	Description	Measurement function	Method
Su-1-G	User satisfaction	The overall satisfaction of the user	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier j = question identifier U = the total number of users Q = the total number of questions S<sub>ij</sub> = the score of the question j given by the user i</p>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix H.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				

## Usefulness measures

ID	Name	Description	Measurement function	Method
Us-1-S	Usefulness	The degree to which a user is satisfied with their perception of achieving their goals	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ i = user identifier j = question identifier U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user	Questionnaire
Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix I. Note 2 To answer the questionnaire, users must use the site before. Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)). Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.				

## Accessibility measures

### Perceivability measures

ID	Name	Description	Measurement function	Method
Pe-1-S	Perception of system status	Realizing the current state of the website allows users to feel in control and take actions to reach their goals.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ i = user identifier j = question identifier U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	Questionnaire
Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix J.				

<p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Pe-2-S	Simple screens	The amount of information on each page of the site is reasonable, there is no excess or lack of information	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier  j = question identifier  U = the total number of users  Q = the total number of questions  S<sub>ij</sub> = the score of the question j given by the user i</p>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix K.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Pe-3-S	Colors and fonts	The website uses colors with adequate contrast between the fonts and the backgrounds and verifies if the fonts have a good size for reading	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{(U * Q)}$ <p>i = user identifier  j = question identifier  U = the total number of users  Q = the total number of questions  S<sub>ij</sub> = the score of the question j given by the user i</p>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix L.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Pe-4-G	Performance	The website load time.	$X = \frac{1}{n} \sum_{i=1}^n S_i$ <p>i = tool identifier  S<sub>i</sub> = value obtained from tests with each tool</p>	Automatic tool

			n = number of tools	
<p>Note 1 Minimum of 3 automatic tools. For example, PageSpeed Insights (<a href="https://developers.google.com/speed/pagespeed/insights/?hl=pt-BR">https://developers.google.com/speed/pagespeed/insights/?hl=pt-BR</a>), Pingdom Website Speed Test (<a href="https://tools.pingdom.com/">https://tools.pingdom.com/</a>), GTMetrix(<a href="https://gtmetrix.com/">https://gtmetrix.com/</a>), tools can be used.</p> <p>Note 2 Minimum of 10 tests per configuration (browser, machine, network).</p> <p>Note 3 Each tool must return a value between 0 to 100, when loading the site; values closer to 100 is better.</p> <p>Note 4 This sub attribute is the same as the one indicated as Ef-4-G.</p>				

### Operability measures

ID	Name	Description	Measurement function	Method
Op-1-S	Back button	All the pages in the website allow users to return to previously visited pages.	$X = \sum_{i=1}^U S_i / U$ i = user identifier U = the total number of users S <sub>i</sub> = the score of the question j given by the user i	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related question can be found in Appendix M.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				
Op-2-S	Perceivable focus	The website makes perceivable which text box has the current focus.	$X = \sum_{i=1}^U S_i / U$ i = user identifier U = the total number of users S <sub>i</sub> = the score of the question j given by the user i	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix N.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				



Op-3-G	Broken links	The amount of website links pointing to non-existent web pages.	$X = \text{Max}(\sum_{i=1}^t S_i(B/Q))$ <i>i</i> = tool identifier <i>B</i> = the amount of broken links <i>Q</i> = the total links of site <i>S<sub>i</sub></i> = the score of broken links provided by the tool	Automatic tool
<p>Note 1 Minimum of 3 automatic tools. For example, Dead Link Checker (<a href="https://www.deadlinkchecker.com/">https://www.deadlinkchecker.com/</a>), Xenu's Link Sleuth (<a href="https://xenus-link-sleuth.softonic.com.br/">https://xenus-link-sleuth.softonic.com.br/</a>), Screaming Frog Seo Spider (<a href="https://www.screamingfrog.co.uk/">https://www.screamingfrog.co.uk/</a>) can be used.</p> <p>Note 2 Each tool must return the total number of links inspected and the number of defective links.</p>				
Op-4-G	Affordable	Checks if the site is accessible, benefiting all people, with or without disabilities.	$X = \text{AVG}(\sum_{i=1}^t S_i)$ <i>S<sub>i</sub></i> = the value of each tool <i>i</i> = indicates the tool number	Automatic tool
<p>Note 1 Minimum of 3 automatic tools. For example, ASES (<a href="http://asesweb.governoeletronico.gov.br/ases/">http://asesweb.governoeletronico.gov.br/ases/</a>), Nibbler (<a href="https://nibbler.silktide.com/">https://nibbler.silktide.com/</a>), Access Monitor (<a href="http://accessmonitor.acesibilidade.gov.pt/amp/">http://accessmonitor.acesibilidade.gov.pt/amp/</a>) can be used.</p> <p>Note 2 Each tool must return a value between 0 to 100, when loading the site; values closer to 100 is better.</p>				

## User experience

### Company information measures

ID	Name	Description	Measurement function	Method
Ci-1-G	Company information	It checks whether some company information is visible on the website's home page.	$X = \sum_{i=1}^U S_i / U$ <i>i</i> = user identifier <i>U</i> = the total number of users <i>S<sub>i</sub></i> = the score of the question <i>j</i> given by the user <i>i</i>	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related question can be found in Appendix O.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p>				

Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)).

Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.

### Company reputation measures

ID	Name	Description	Measurement function	Method
Cr-1-S	Company reputation	The company's reputation based on consumer experiences.	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{U * Q}$ i = user identifier j = question identifier U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	Questionnaire

Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix P.

Note 2 To answer the questionnaire, users must search the company on the reputation expert websites (for example, ReclameAqui (<https://www.reclameaqui.com.br/>) e-bit (<https://www.ebit.com.br/>)).

Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)).

Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.

### Privacy policies measures

ID	Name	Description	Measurement function	Method
Pp-1-	Privacy policies	The way the customer information is collected and used, as well as the use of third	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{U * Q}$ i = user identifier j = question identifier	Questionnaire

		parties for secure transactions and for the protection of personal data, are perceivable, bypassed with a consistent privacy policies.	U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix Q.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999))</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				

### Customer opinions measures

ID	Name	Description	Measurement function	Method
Co-1-G	Customer opinions	Information obtained from users through inspection feedbacks and comments from other customers	$X = \frac{\sum_{i=1}^U \sum_{j=1}^Q S_{ij}}{U * Q}$ i = user identifier j = question identifier U = the total number of users Q = the total number of questions S <sub>ij</sub> = the score of the question j given by the user i	Questionnaire
<p>Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix R.</p> <p>Note 2 To answer the questionnaire, users must use the site before.</p> <p>Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)).</p> <p>Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.</p>				

### Pleasure measures

ID	Name	Description	Measurement function	Method
SPI-1-G	User pleasure	The user enjoys using the system.	$X = \sum_{i=1}^U S_i / U$ i = user identifier U = the total number of users S <sub>i</sub> = the score of the question j given by the user i	Questionnaire
Note 1 The questionnaire uses as Likert scale point (1 to 7) and the related questions can be found in Appendix S. Note 2 To answer the questionnaire, users must use the site before. Note 3 Minimum 31 users (to meet statistical significance in accordance to Triola(1999)). Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.				

### Padlock measures

ID	Name	Description	Measurement function	Method
Pa-1-G	Visible Padlock	The padlock, as a security symbol should be visible.	$X = \{1, 0\}$ 1 – it indicates that the site has the lock. 0 – it indicates that the site hasn't the lock	Questionnaire
Note 1 The related question can be found in Appendix T. Note 2 To answer the questionnaire, users must use the site before. Note 3 Minimum 31 number of users (to meet statistical significance in accordance to Triola(1999)). Note 4 The site must be tested in different browsers (i.e, Firefox, Chrome, Safari) and with a minimum of 10 users in each browser.				

### Reference

TRIOLA, Mário F. Introdução à Estatística. 7a. Ed. Rio de Janeiro: LTC, 1999.