





UX4ALL: A Repository of User Experience Evaluation Methods

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Abstract: The evolution of the User Experience (UX) area is crucial for the success of any design or system development process. Although numerous UX evaluation methods exist, understanding and utilizing these methods can be challenging for interested parties. In this context, the Experience Research Society (EXPRESSO) platform aims to support the comprehension of UX by providing data on over 80 UX evaluation methods. However, the platform's content has limitations that hinder understanding and application. In this sense, this research proposes to create a new repository model for UX evaluation methods called UX4ALL. We intend to democratize access to UX evaluation knowledge. We developed UX4ALL using data collected from the EXPRESSO platform, which underwent analysis, selection, enrichment, and classification before being included in the UX4ALL prototype. Furthermore, we used the System Usability Scale (SUS) method to evaluate the prototype. In addition, a UX expert assessed the UX4ALL. We used the results to support the development of the second version of UX4ALL. The main contributions of this research are: (1) The democratization of understanding UX evaluation practices; and (2) The creation of an easy-to-use repository prototype for UX evaluation methods, named UX4ALL Future studies aim to evolve the prototype into a final product, making it accessible to all interested parties and contributing to the popularization of UX practices.

1 INTRODUCTION


In the field of Human-Computer Interaction (HCI), User Experience (UX) emerged from a desire to understand how individuals feel when interacting with technology (Hassenzahl, 2018). According to ISO 9241-110:2020 (Din, 2020), UX is defined as the combination of user perceptions and responses that arise from using or anticipating the use of a system, product, or service. Researchers within the HCI community argue that UX has subjective, holistic, situational, and temporal characteristics, strongly emphasizing design (Bargas-Avila and Hornbæk, 2011; Roto et al., 2011). However, each of these attributes brings specific requirements for both design and evaluation (Lallemand, 2015).


UX evaluation includes various methods designed to assess the emotional, cognitive, and sociocultural aspects of user interactions with products and systems


(Maia et al., 2020). However, finding a comprehensive and clear resource on the application of UX evaluation methods can be challenging for researchers and professionals. This difficulty arises when they attempt to select the most appropriate approach for evaluating the quality of user interactions with digital products and systems.


Collaboration between the academic and professional communities is essential for disseminating knowledge and information in the field, fostering its continuous development. Aiming to promote awareness and understanding of UX, the Experience Research Society platform (EXPRESSO¹) was created to provide various resources for user experience research. The platform is maintained by academics and professionals in the field and is supported by an executive committee from several countries. EXPRESSO offers information on 81 UX evaluation methods. However, in a prior experience using the platform, it was deemed “inefficient” due to significant shortcomings found in the tool. One of the main limitations observed is the restricted information provided

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for each UX evaluation method (Oliveira et al., 2023). When navigating the platform's catalog of methods, it is common to encounter incomplete texts, vague descriptions, and references with unavailable or restricted links. This creates a barrier for those interested in finding detailed and reliable information about UX evaluation methods.

A diagnostic analysis of the EXPRESSO platform revealed that the method descriptions, intended to provide crucial information for their application, lack consistency. Some methods are presented with detailed descriptions, while others offer only a superficial summary. Moreover, the quality of the descriptions is insufficient to enable someone intending to conduct a UX evaluation to apply the method based solely on the information provided. In this way, EXPRESSO becomes only an intermediary for users to identify different UX evaluation methods, failing to effectively clarify their application process. To obtain such information, users must consult additional resources. This lack of uniformity creates an uneven experience for EXPRESSO users, leaving them uncertain about the quality and amount of knowledge available for each method.

Motivated by the practical problem described and aiming to address potential knowledge gaps regarding UX evaluation methods, this research seeks to create and evaluate a new data repository model for UX evaluation methods, called UX4ALL (UX for All). This repository aims to provide clear and objective information to support researchers, students, and industry professionals in applying UX evaluation methods within their respective contexts.

Thus, the following research question (RQ) guides the execution of this work:

- **RQ:** Is it possible to propose a repository of UX evaluation methods that present relevant and easy-to-understand information to democratize UX practices?

To achieve the objective of this work and address the RQ, we used the EXPRESSO platform as an input data source to extract and filter the UX evaluation methods. In the data extraction phase, the 81 UX evaluation methods available on the platform were characterized and classified. During the filtering phase, we selected some UX methods based on predefined quality criteria. Finally, we developed UX4ALL, a new UX evaluation method repository prototype. The new repository aims to ensure the standardization and quality of the information provided.

A study of the first version of the UX4ALL prototype and an evaluation carried out by an expert in the field of UX showed that UX4ALL provides relevant and easy-to-understand information. These eval-

uations provide evidence positioning UX4ALL as a support tool for users interested in selecting and applying UX evaluation methods, democratizing knowledge of UX practices.

The main contributions of this research are: (1) The democratization of understanding UX evaluation practices; and (2) The creation of an easy-to-use repository prototype for UX evaluation methods, named UX4ALL² (UX for All).

2 BACKGROUND

The concept of User Experience (UX) emerged in the 1990s when Don Norman recognized that traditional Human Interface and Usability principles did not encompass all aspects of a user's interaction with a system (Norman, 2008). According to Hassenzahl, UX distinguishes itself by utilizing a holistic and multidisciplinary approach to product development (Hassenzahl, 2008). From an industrial perspective, Apple emphasizes the importance of UX in the product design process, noting that even seemingly trivial issues can become quite complex. For instance, determining the location and function of the power button on Apple computers can present significant challenges (Norman et al., 1995).

Araújo (2024) states that “with the constant emergence of new technologies, products are becoming increasingly interactive, and, consequently, their development must also focus on user experiences resulting from these interactions.” Thus, to ensure that products meet user expectations and provide a positive experience, UX evaluation methods become indispensable tools (Lachner et al., 2017). By gathering data on how users interact with a system, we can gain valuable insights into user behavior, difficulties, frustrations, and satisfaction points (Nakamura et al., 2023).

UX has become a crucial quality attribute to consider in software projects (Marques et al., 2019). Identifying the various aspects of UX evaluation and navigating the diverse range of available methods poses significant challenges (Nakamura et al., 2019). This complexity is further heightened by the wide range of evaluation methods available (Díaz-Oreiro et al., 2019), which range from questionnaires to biophysiological measures aimed at assessing different dimensions such as enjoyment, pleasure, and emotions. Moreover, the challenges of UX evaluation are intensified by the field's evolving nature. As highlighted by Hussain *et al.*, UX research is characterized by its emergent qualities, which come with difficulties

² <https://tinyurl.com/UX4ALL>

in developing effective evaluation methods (Hussain et al., 2018).

According to Saad *et al.*, UX methods are highly significant as they ensure that the development phase of a system progresses in a timely manner (Saad et al., 2021). In every element where user interaction occurs, there are usage experiences. Thus, UX methods vary depending on the type of interaction and are intended for evaluating products, prototypes, concepts, or design aspects (Vermeeren et al., 2010).

Many UX methods demand a centralized source, such as a repository, where researchers, professionals, or enthusiasts can consult them. To address this need, Oliveira et al. developed a web platform (Oliveira et al., 2023). As a database, the authors used a previous version of the EXPRESSO platform, known as AllAboutUX³. The authors addressed the problem faced by users in selecting the most suitable UX evaluation method for their projects due to the large variety of available methods. In this sense, Oliveira et al. introduced UXNator, a tool designed to recommend UX evaluation methods (Oliveira et al., 2023). While using AllAboutUX as a data source, the authors observed that some methods cataloged on the EXPRESSO platform lacked adequate documentation to guide their application or were not directly aligned with the scope of UXNator, which focuses on software evaluation.

This work, similar to that of Oliveira et al. (Oliveira et al., 2023), uses data from EXPRESSO (formerly known as AllAboutUX). However, our goal is to create a repository of UX methods that extends beyond the context of software evaluation. We aim to include methods applicable to various areas and products, such as software and games.

3 METHODOLOGY

This work outlines the initial phase of a research project designed to assist researchers, students, and industry professionals in evaluating user experience. The project aims to guide them in selecting the appropriate UX evaluation methods and effectively applying these methods in their respective projects. Figure 1 illustrates the steps involved in creating the UX4ALL repository, as detailed below:

Diagnostic Analysis of the EXPRESSO Platform — This step aimed to identify the strengths and weaknesses of the EXPRESSO platform. Initially, the first two authors of this research used the platform and explored its functionalities, enabling an initial evalua-

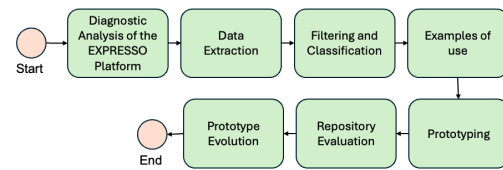


Figure 1: UX4ALL repository build steps.

tion of the tool. Subsequently, to validate the authors' perceptions, an interview was conducted with 17 participants, who were asked two open-ended questions about their experiences using the EXPRESSO platform. These participants engaged with the platform under the same usage context as the authors. Each comment was analyzed and categorized into specific codes, differentiating between positive points, negative points, and suggestions for improvement. Following the initial coding, the codes were refined by grouping and quantifying mentions of each theme.

Data Extraction — In this step, we characterized and classified the 81 UX evaluation methods available on the EXPRESSO platform. As a result, we developed an artifact called the Method Characterization Model for each UX evaluation method. This model includes the following information: method name, definition, application criteria, references, and year of publication. We extracted the data from the information provided by the EXPRESSO platform. When information on the platform was unavailable, we conducted additional research using other sources. We also highlighted any missing data in the Method Characterization Model to indicate the absence of information on the EXPRESSO platform.

Filtering and Classification — In this step, we selected the UX methods for inclusion in the UX4ALL repository. We selected the UX methods based on selection criteria created by the first two authors of this research and validated by a UX expert. The selection process relied on the criteria established during the "Data Extraction" step. In total, four criteria were defined: Guidance, Scope, Free Access, and Reproducibility. The definition of each criterion is outlined as follows: (1) **Guidance** – The method must include instructions for its application and the evaluation of results; (2) **Scope** – The method must be used by individuals with different profiles; (3) **Free Access** – The method must be accessible without associated costs; and (4) **Replicability** – The evaluation using the method should be replicable.

After the filtering process, ten methods were selected and classified according to their respective categories, resulting in three distinct groupings: "Observation," "Scale," and "Self-report" (Rivero and Conte, 2017). The observation category includes those meth-

³<https://experience.aalto.fi/all-about-ux-blog/>

ods used to analyze the user within the context of use. The scale category includes questionnaires, ratings, and other quantitative metrics designed to measure specific aspects of the user experience. Lastly, self-report methods allow users to provide qualitative feedback, enabling them to express their opinions and feelings openly (Rivero and Conte, 2017). We assigned a specific color to each category for clarity: green for Observation, blue for Scale, and brown for Self-report. This color-coded classification provides visual cues that facilitate the identification of available methods in the UX4ALL repository.

Examples of Use — Once the methods were selected, the next step involved creating use case examples for each method. During this phase, all chosen methods were applied with users to generate practical examples of their application. The outcomes of this step provide valuable information that enhances the descriptions of the methods available in the UX4ALL repository.

Prototyping — In this step, we developed the first version of the UX4ALL prototype. We established a standardized format for presenting the methods in UX4ALL, ensuring consistency in the information available in the repository. We defined a catalog record format with the following fields: Method Name, Author, Method Type, Number of Participants, Advantages, Limitations, How to Apply, Use Case Example, Available Material (if any), and Bibliographic References. These records were completed and validated by experts. Finally, we created the first version of the UX4ALL repository prototype using the Figma prototyping tool⁴.

Repository Evaluation — We conducted an exploratory experiment involving six participants who were knowledgeable about UX methods and had prior experience with the EXPRESSO platform. The participants, comprising students from Computing and Design courses, were engaged to assess the usability of the first version of UX4ALL. We collected qualitative data during the evaluation by observing how participants interacted with the repository. Additionally, we distributed a System Usability Scale (SUS) questionnaire to gather their feedback. We also presented the first version of the UX4ALL repository to a UX and Human-Computer Interaction expert, who provided valuable insights into the repository.

It is important to emphasize that the entire process was carried out ethically, with the consent of the participants. Each participant signed a Free and Informed Consent Form (FICF) before the study, which ensured they understood and agreed to the procedures and objectives of the research purposes, thereby safe-

guarding the ethics and integrity of the research.

Prototype Evolution — After analyzing the results from user observations during the exploratory experiment, the feedback from the SUS method, and the expert's opinions, we implemented improvements in the repository, developing a second version of the UX4ALL repository.

4 UX4ALL REPOSITORY

4.1 Diagnostic Analysis

The first two authors of this paper conducted the initial diagnostic analysis of the EXPRESSO platform. The first two authors had their first contact with the EXPRESSO platform during an assessment activity in the HCI course. The assessment required students to use UX evaluation methods to assess an application of their choice. The course professor introduced EXPRESSO as a platform specifically designed to assist in selecting appropriate UX evaluation methods.

As a result of the initial diagnostic evaluation, the two first authors of this research identified that, despite providing information on different UX methods, the EXPRESSO platform did not provide the necessary detailed information for applying the UX evaluation methods. The authors also noticed that data on the methods repeated in different information fields provided by the platform or were incomplete. In addition, the authors observed a superficial description of the methods. The data field contents were considered confusing and incomplete. The analysis showed the platform's positive points, for example, information on the advantages and disadvantages of the methods. However, not all methods provided this information.

To gain a deeper understanding and obtain specific, relevant information, users often need to search for the method's name in external sources. Additionally, there is a notable lack of helpful resources that could aid in understanding and applying these methods, such as printable questionnaires or practical examples. Moreover, the initial diagnostic analysis indicated that the page for evaluation methods on the platform can be unintuitive for first-time users. The pathway to access this page is somewhat unclear. For example, users must deduce that they must click on the "Resources" section in the header to find a button directing them to the repository.

To further support the diagnostic analysis of the EXPRESSO platform, we invited 17 HCI students who participated in an HCI assessment to share their opinions about their experience in using EXPRESSO. To do so, the students answered two questions: "Did

⁴<https://www.figma.com/>

using the EXPRESSO platform help or hinder you in selecting UX evaluation methods?” and “Do you have any suggestions for improving the EXPRESSO platform?” The students’ responses were analyzed qualitatively. We performed an open coding process to identify and categorize the students’ responses into themes that highlight the strengths and weaknesses of the EXPRESSO platform.

The qualitative analysis enabled a deeper analysis of the student’s answers, showing that the EXPRESSO platform is valuable for supporting UX evaluation methods selection and presenting a variety of available methods. However, only 5 participants (P4, P5, P6, P9, and P13) reported a positive experience using EXPRESSO, while the remaining 12 participants provided feedback ranging from mixed (positive and negative) to entirely negative experiences.

Despite offering a wide range of methods, the diagnostic analysis showed the platform has significant limitations. Many methods lack the content and information necessary for their application, particularly those requiring questionnaires or other specific materials (P17). Even when external reference links are available, they are often inaccessible (P15 and P16). Consequently, we believe only the simplest methods can be fully applied using the platform alone. This limitation forces users to seek additional information from other sources (P1), potentially impacting the overall user experience. The analysis and processing of the data are publicly available⁵.

4.2 Data Extraction

To organize the data extracted from the EXPRESSO platform, we cataloged the 81 UX evaluation methods. The cataloging artifact contains the name, a brief description of the method, the context of application for each method, the references, and the year of publication. The artifact resulting from this step is available for consultation⁵.

We could note that some of the cataloged methods lack bibliographic references detailing the origins of the evaluation methods. To ensure a clear characterization of these methods, we supplemented missing information through searches on digital libraries that index scientific research. During the data extraction phase, we also observed a lack of essential details, such as guidance on how to apply the methods with users, the required number of participants, and the process for analyzing the results. This missing information poses challenges in understanding how to effectively use the methods.

⁵<https://figshare.com/s/73f85d7378bb84cba4ae>

4.3 Filtering and Classification

We selected ten UX evaluation methods that satisfied the established selection criteria in this step. These methods included *AttrackDiff*, *Audio Narrative*, *Co-discovery*, *EmoCards*, *Experiential Contextual Inquiry*, *Geneva Appraisal Questionnaire*, *NASA-TLX*, *Positive and Negative Affect Schedule*, *System Usability Scale*, and *3E*. According to Rivero and Conte (Rivero and Conte, 2017), it is possible to systematically categorize these methods. In this research, we classified the UX methods into three categories: observation methods, scale methods, and self-report methods, based on the “Filtering and Classification” step described in Section 3.

We assigned a corresponding color to each category: green for observation methods, blue for scale-based methods, and brown for self-report methods. The color-coded filter allows users to visualize and select the most appropriate UX evaluation method for their context.

4.4 Examples of Use

We used the UX evaluation methods on real case studies to collect examples of use for the methods selected during the filtering step. This process required research beyond the EXPRESSO platform to understand each method fully and to establish the necessary procedures for their application. Some methods, such as the Geneva Appraisal Questionnaire and 3E, already had examples published in previous studies.

The configurations used to create the examples of use for the UX evaluation methods are available⁵. We highlight the UX evaluation method employed, the context of the application being evaluated, the activities conducted during the evaluation process, the characterization of the participants, and the number of participants involved.

4.5 Prototyping

After creating examples of how to utilize the methods, we established a standardized set of information to be provided for each method in the UX4ALL repository. Since the data presented by the EXPRESSO platform had numerous inconsistencies, it was critical to ensure that the newly developed repository model did not inherit these flaws. To achieve this, UX4ALL offers a comprehensive and uniform set of information for all cataloged methods. This includes the method name, author, method type, minimum number of participants, application process, usage examples, advantages, limitations, and references.

The standardized presentation of data is designed to ensure the integrity and quality of the information provided, creating a more consistent and reliable experience for users of UX4ALL. By adopting a standardized approach, we aim to address the shortcomings observed in the current model, ultimately offering a more comprehensive and useful resource for the UX evaluation community.

The graphic design of the interface for the UX4ALL repository aims to facilitate ease of use for interested users. Methods are presented in a card format and categorized using a color scheme that enables quick identification of their respective categories.

The first version of the UX4ALL repository comprises three main functionalities⁵: the 'About UX,' 'Methods,' and 'Categories' pages. Additionally, a search bar is positioned at the top of the screen as a navigation component. The search bar provides a quick way to find information within the repository.

The "About UX" page includes a mind map that outlines key concepts and terminology within the UX field². The mind map was developed based on the white paper by Roto et al. (Roto et al., 2011). This model was selected for its effectiveness as a visual representation, which simplifies complex ideas by organizing information in a connected structure centered around a central theme (Buzan, 1994). Additionally, mind maps facilitate information retention, making them a versatile and efficient tool for understanding and organizing content.

On the "Methods" page², ten selected evaluation methods are displayed. UX4ALL shows the methods using color-coded cards to indicate their respective categories. In UX4ALL, a grid layout has been employed to showcase the cards, providing a more visually appealing presentation compared to a traditional list format.

Grid navigation is intuitive for users, particularly those who are familiar with e-commerce platforms and social media. Additionally, the grid layout enables the inclusion of images, icons, and other visual elements, making the interface more engaging and aesthetically pleasing.

On the "Categories" page², the three main categories encompassing the methods in UX4ALL are described: scale-based methods (blue), observation methods (green), and self-report methods (brown).

5 ASSESSMENT OF UX4ALL

We conducted an exploratory experiment to evaluate the initial version of the repository UX4ALL. The experiment involved six participants, all undergraduate

students in Computing and Design with prior knowledge of UX and experience using the EXPRESSO website. These participants were invited to explore the prototype without specific guidance or a predefined time limit, allowing for a natural immersion in the proposed interface. During this exploration, their experiences were carefully documented and recorded to capture nuances and spontaneous reactions.

A qualitative analysis of the data collected through observations revealed both positive aspects and areas for improvement. One of the most significant findings was the inconsistency in the information presented on the cards, particularly the use of the term "disadvantages" rather than "limitations." This discrepancy was noted by a participant during their interaction with the prototype, underscoring the importance of consistent language throughout the content.

An additional issue raised during the experiment was the lack of clarity concerning the colors of the cards used to present UX methods. One participant questioned whether the colors were intentionally related, as there was no clear indication of their meaning. Furthermore, participants reported difficulty scrolling back to the methods page, which highlighted certain prototyping issues that need to be addressed to ensure smooth and intuitive navigation.

Users expressed appreciation for the information presented on the site, finding it relevant and useful for their needs. Feedback like "Can I take notes?" and "I'll save this link; it has very useful information for me" highlights the value of the content provided by UX4ALL. While some participants initially noted the extensive amount of text, they later recognized the relevance of the information after reading it.

Participants were invited to assess their experience using the well-known System Usability Scale (SUS) questionnaire (Brooke et al., 1996). This instrument provided a quantitative evaluation that complemented the qualitative observations. The results of the SUS evaluation indicated an acceptable usability score, with an average of 93.75 points. This suggests that the participants encountered no major issues with the system, successfully achieved their goals, and had an overall satisfactory experience.

A UX specialist reviewed the UX4ALL first version and provided several key recommendations: (1) enhance the platform's UI by incorporating images related to the methods to attract future users, (2) create a dedicated section to present the project and its authors, (3) integrate a form that allows users to contribute additional methods, thereby transforming the platform into a collaborative environment, and (4) add new evaluation methods. These suggestions aim to improve user experience and strengthen the commu-

nity around the project, promoting participation and knowledge sharing.

In response to our research question, we conclude that it is indeed possible to create a repository of UX evaluation methods that offers relevant and easily understandable information. This repository should be educational, provide materials and application examples, and be reviewed and standardized, ultimately democratizing UX practices. Feedback from participants indicates that UX4ALL contains useful and relevant content, with thorough and complete descriptions of the methods. It offers resources that facilitate searches and adds value through its collaborative approach. However, challenges remain, including the limited number of available methods, the diversity of method categories, and the language used for UX4ALL. These issues need to be addressed in future versions of the repository.

6 UX4ALL EVOLUTION

Based on the results obtained from the exploratory study and the feedback from the UX specialist, we improved the repository UX4ALL. We also added five new UX evaluation methods to the repository, aiming to expand the range of methods available ².

Moreover, a new tab was added to the UX4ALL homepage, the “About Us.” This tab is designed to provide information about the repository’s purpose, as well as include a form for the community to contribute to the repository’s growth ². The new “About Us” tab aims to create opportunities for dialogue between the repository and users interested in collaborating with this initiative.

The repository interface has been enhanced. The changes made UX4ALL more visual and interactive, making it easier to find the materials needed to understand and apply UX evaluation methods. The layout of the “Methods” page was redesigned. Images corresponding to each presented method were added ². Finally, a “Available Material” section was included on the pages describing the methods ², providing the necessary instruments for applying the methods ².

7 CONCLUSION

This research presents the initial design and evaluation of a new repository model for UX evaluation methods, named UX4ALL. We created the repository prototype to provide comprehensive information about UX evaluation methods and help democratize UX practices for all interested individuals. Using

UX4ALL, users can access pages that explain the concept of UX and the categories of each UX evaluation method. In addition, users can contribute by adding information about new UX methods to expand the repository’s offerings.

The motivation behind developing UX4ALL stemmed from the challenges encountered while using the EXPRESSO platform, which was described as frustrating by the first two authors of this research. A diagnostic evaluation of EXPRESSO revealed several significant limitations, including the lack of detailed method descriptions, insufficient practical use examples, broken links to bibliographic references, and missing materials necessary for applying the methods. In response, UX4ALL aims to address these shortcomings and meet the needs of individuals seeking to understand and implement UX evaluation methods. This effort ultimately aims to promote the democratization of UX practices. The new repository addresses the most common issues highlighted by participating students and the first two authors, such as updating references, adding application materials, and providing practical examples.

The UX4ALL repository currently has limitations, especially in terms of the number of available UX evaluation methods. To address this issue, we will conduct a new cataloging of UX evaluation methods. Additionally, the community can help expand the repository by suggesting new methods through the form available in the “About Us” section of the current UX4ALL version ².

The initial evaluation of UX4ALL focused on usability and user satisfaction. To gain deeper insights into its effectiveness, comparative evaluations with other platforms will be necessary. Additionally, the familiarity of participants with the methods used in UX4ALL and the influence of individual preferences should be considered as limitations in assessing the repository’s overall effectiveness.

For future work, we envision the following goals: (1) validation in an academic context to conduct a deeper analysis of UX4ALL use, ensuring that its content meets user needs and addresses gaps found in EXPRESSO; (2) addition of new UX evaluation methods in collaboration with the academic and professional communities; (3) evolution of the prototype into a software product; and (4) exploration of the reliability of information about UX evaluation methods produced by large-scale language models (LLMs), considering the current technological trends.

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REFERENCES

- Araújo, F. S. (2014). *User experience assessment: a proposal for systematization of the product development process (in Portuguese)*. 2014. 238 p. PhD thesis, Universidade Federal de Santa Catarina, Centro Tecnológico.
- Bargas-Avila, J. A. and Hornbæk, K. (2011). Old wine in new bottles or novel challenges: a critical analysis of empirical studies of user experience. In *Proceedings of the SIGCHI conference on human factors in computing systems*, pages 2689–2698.
- Brooke, J. et al. (1996). Sus-a quick and dirty usability scale. *Usability evaluation in industry*, 189(194):4–7.
- Buzan, T. (1994). *The Mind Map Book*. Dutton.
- Díaz-Oreiro, I., López, G., Quesada, L., and Guerrero, L. A. (2019). Standardized questionnaires for user experience evaluation: A systematic literature review. In *Proceedings*, volume 31, page 14. MDPI.
- Din, E. (2020). Ergonomie der mensch-system-interaktion-teil 110: Interaktionsprinzipien (iso 9241-110: 2020)[ergonomics of human-system interaction-part 110: Interaction principles]. *Deutsche Fassung EN ISO*, pages 9241–110.
- Hassenzahl, M. (2008). User experience (ux) towards an experiential perspective on product quality. In *Proceedings of the 20th Conference on l'Interaction Homme-Machine*, pages 11–15.
- Hassenzahl, M. (2018). The thing and i (summer of'17 remix). *Funology 2: From usability to enjoyment*, pages 17–31.
- Hussain, J., Ali Khan, W., Hur, T., Muhammad Bilal, H. S., Bang, J., Ul Hassan, A., Afzal, M., and Lee, S. (2018). A multimodal deep log-based user experience (ux) platform for ux evaluation. *Sensors*, 18(5):1622.
- Lachner, F., Fincke, F., and Butz, A. (2017). Ux metrics: Deriving country-specific usage patterns of a website plug-in from web analytics. In *Human-Computer Interaction-INTERACT 2017: 16th IFIP TC 13 International Conference, Mumbai, India, September 25–29, 2017, Proceedings, Part III 16*, pages 142–159. Springer.
- Lallemant, C. (2015). Towards consolidated methods for the design and evaluation of user experience.
- Maia, M. A. Q., Barbosa, R. R., and Williams, P. (2020). Usabilidade e experiência do usuário de sistemas de informação: em busca de limites e relações. *Ciência da Informação em Revista*, 6(3):34–48.
- Marques, L., Matsubara, P., Nakamura, W., Wiese, I., Zaina, L., and Conte, T. (2019). Ux-tips: A ux evaluation technique to support the identification of software application problems. In *Proceedings of the XXXIII Brazilian Symposium on Software Engineering*, pages 224–233.
- Nakamura, W. T., de Oliveira, E. H., and Conte, T. (2019). Negative emotions, positive experience: What are we doing wrong when evaluating the ux? In *Extended abstracts of the 2019 chi conference on human factors in computing systems*, pages 1–6.
- Nakamura, W. T., Marques, L. C., Redmiles, D., de Oliveira, E. H., and Conte, T. (2023). Investigating the influence of different factors on the ux evaluation of a mobile application. *International Journal of Human-Computer Interaction*, 39(20):3948–3968.
- Norman, D., Miller, J., and Henderson, A. (1995). What you see, some of what's in the future, and how we go about doing it: Hi at apple computer. In *Conference companion on Human factors in computing systems*, page 155.
- Norman, D. A. (2008). *Design emocional: por que adoramos (ou detestamos) os objetos do dia-a-dia*. Rocco.
- Oliveira, S., Cristo, A., Geovane, M., Xavier, A., Silva, R., Rocha, S., Marques, L. C., Gomes, G., Gadelha, B., and Conte, T. (2023). Uxnator: A tool for recommending ux evaluation methods. In *ICEIS (2)*, pages 336–343.
- Rivero, L. and Conte, T. (2017). A systematic mapping study on research contributions on ux evaluation technologies. In *Proceedings of the XVI Brazilian symposium on human factors in computing systems*, pages 1–10.
- Roto, V., Law, E.-C., Vermeeren, A. P., and Hoonhout, J. (2011). User experience white paper: Bringing clarity to the concept of user experience.
- Saad, J., Martinelli, S., Machado, L. S., de Souza, C. R., Alvaro, A., and Zaina, L. (2021). Ux work in software startups: A thematic analysis of the literature. *Information and Software Technology*, 140:106688.
- Vermeeren, A. P., Law, E. L.-C., Roto, V., Obrist, M., Hoonhout, J., and Väänänen-Vainio-Mattila, K. (2010). User experience evaluation methods: current state and development needs. In *Proceedings of the 6th Nordic conference on human-computer interaction: Extending boundaries*, pages 521–530.