

Usability evaluation focused on user experience of repositories related to energy sustainability: A Literature Mapping

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ABSTRACT

This paper presents a systematic literature mapping about two types of studies about interaction using repositories energy sustainability, (1) studies related to users' experience, and (2) studies about usability evaluation, to add 78 studies in this field of knowledge, in order to answer the following research questions: How many studies have been done to evaluate the usability of a Repository? How many studies have been done to use the approach the user experience on repositories? and What are the dimensions and tools used for evaluate usability? Ultimately, the collected information will be used to document the state of a PhD thesis that aims to create a prototype for the usability evaluation of OAR that will lend visibility to the results of a project entitled "A Binational Laboratory for the Intelligent Management of Energy Sustainability and Technological Formation."

CCS CONCEPTS

• Human-centered computing~User centered design

KEYWORDS

User experience, Open Access Repository, evaluation usability

1 INTRODUCTION

The open educational movement allows access to knowledge through the use of interactive systems, which have been configured to consult the information openly and from any place to the general public. Acceptance of an interactive system, such as repositories energy sustainability, depends on the quality of the "user experience" (UX) when using it. Repositories give visibility to the scientific and academic production generated within the institutions of higher education and research centers.

The objective of the systematic literature mapping approach utilized in this study is to guide the state of the art in order to answer the following research questions:

- RQ1 - How many studies have been done to evaluate the usability on repositories?
- RQ2 - How many studies have been done to use the approach the user experience on repositories?
- RQ3 - What are the dimensions and tools used for to evaluate usability?

This study uses a systematic mapping review to categorize and summarize existing information concerning these research questions; as such, it can be viewed as a method of investigation that is very similar to a survey. It is important to note, however, that

a survey includes people while a systematic review involves literature.

User experience (UX) as a field seeks to offer a systematic approach to design and analysis of the user’s holistic experiences with the technology [7]. As a quality attribute that is an increasingly important success factor of any interactive technology, on a general level, UX refers to users’ perceptions and responses that arise in the use of an interactive system.

Going beyond this definition, UX covers a broad set of users’ experiences based on the instrumental (pragmatic) and non-instrumental (hedonic) system qualities [5] instrumental qualities cover traditional viewpoints like usability and efficiency of the system but also other experiential aspects, such as supporting sense of achievement, flow and self-esteem. The hedonic aspects enable experiences related to pleasure, stimulation, social connectedness, inspiration and self-expression

2 RESEARCH METHOD

Various authors [8, 10] describe a process of systematic literature review that is combined with a synthesis of the research evidence; such a combination results in a "meta-analysis" and provides quantitative results that have been gathered from multiple perspectives.

Along these lines, this study is based on the three stages associated with a systematic review of the literature and is developed according to [8]. During Stage 1, the review is planned and researchers must develop a strategy that focuses on a systematization of the information related to the research questions. Furthermore, the strategy must also be considered in light of the review protocols. During Stage 2, the review is conducted; the main goals of this stage are to locate primary resources that address the research questions and to extract relevant information from their summaries. This will ensure relevance and quality and will allow for a synthesis of data that can be used to classify information according to its ability to answer the research questions. In Stage 3, the review is reported. The objectives of this stage are to present the valuable information that has been gleaned from the various studies, to systematize the results according to their respective research questions, and to uncover any gaps in knowledge as they relate to these contexts.

The stages of a mapping literature Review are presented in Table 1.

Table 1: The stages of a mapping.

Planning Identification need for a review. Specifying RQs Developing review protocol	Conducting Search Study selection Quality assessment Data extraction Data analysis	Reporting Extracting and discussing results Writing report Formatting Report Evaluating report
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To this end, the following steps are considered, wherein researchers must:

- Identify keywords and search terms that suit the research question(s).
- Conduct traditional research to procure articles in order to identify the terms that are most appropriate for search; this determination should be validated by at least two researchers who are experts in the field.
- Establish electronic databases to be used during the research study, including filters that can be used to specify the year, par evaluation, etc.
- Conduct a search using database keywords and export the files in an Excel-friendly format with such specific fields as "Abstract" and "Title."
- Read each of the titles and abstracts to determine whether they apply to the research context.

3 PLANNING STAGE

In this stage, the following activities are performed:

3.1. The research question is established

- RQ1 - How many studies have been done to evaluate the usability of a Repository?

In terms of this RQ, our aim was to investigate what types of tools are used and how they are utilized for measuring the repository evaluation.

- RQ2 - How many studies have been done to use the approach the user experience on repositories?

Concerning this RQ, we analyzed the included studies in terms of methodologies that are used to repositories from the user

experience perspective.

- RQ3 - What are the dimensions and tools used for to evaluate usability?

On one hand, we analyze what kind of contexts the usability evaluation and the perspective of the user's experience are being studied. On the other hand, our aim was to know which tools are used for the involvement.

3.2 The need for a systematic review is identified

The need to identify which studies have addressed the usability assessment from the user experience applied in Institutional Repositories can guide us to use cases of success as a reference and to prevent risks, in this way to choose best practices and parameters for apply the design to the processes and refine the instruments that will be used to evaluate the usability of the Institutional Repository.

4 CONDUCTING STAGE

In this stage, the systematic review process begins. Decisions are made by considering the titles, abstracts, and keywords of the studies. A systematic search is initiated by examining the search terms as they relate to the research question and by identifying keywords.

In order to identify the need to propose a systematic literature mapping about the evaluation of the usability of repositories and the perspective from which they are designed, a seek was made for systematic reviews of the literature on: a) Systematic literature review and user experience, b) Systematic literature review and usability evaluation, c) Systematic literature review and user experience and repositories, d) Systematic literature review and usability evaluation and repositories, in order to identify the existence of this type of studies in the databases SCOPUS and WOS for to know who are investigating it and what are the results obtained from the usability evaluation.

5 IDENTIFYING THE RESEARCH STRATEGY

The keywords and operators were selected, as well as the decision was made to divide the search into groups. See [Table 2](#).

Table 2. Groups, category and keyword.

Group	Category	Keyword
G1	Studies of systematic review of literature about user experience	"systematic literature review" AND "user experience"
G2	Studies of systematic review of literature on usability evaluation	"systematic literature review" AND "usability evaluation"
G3	Studies of systematic review of literature about user experience and repositories	"systematic literature review" AND "user experience" AND "repositories"
G4	Studies of systematic review of literature on usability evaluation and repositories	"systematic literature review" AND "usability evaluation" AND "repositories"
G5	Studies of user experience and usability evaluation	"user experience" AND "usability evaluation"
G6	Studies of user experience and repositories	"user experience" AND "repositories"
G7	Studies usability evaluation and	"user evaluation" AND "repositories"

Next step is to establish electronic databases and inclusion and exclusion parameters:

a) The search resources were selected:
SCOPUS and Web of science (WoS).

b) Include and exclude filters:

Period of time: 2012 to Jun 2017

Document type: Articles

Language: English

Criteria for keywords linked to the “AND” operator:

- a) The study’s abstract offers a detailed description of the context (in this case, Repositories).
- b) The study’s abstract provides guidelines regarding how the evaluation may be applied.
- c) The study’s abstract presents clear results that were obtained following an application of the context.
- d) SCOPUS was the first search option and articles that were repeated in WOS were eliminated to avoid duplication.

6 SELECTING THE PRIMARY STUDIES

We searched the selected databases indicating the inclusion and exclusion criteria and the results for each search were exported to an Excel compatible format that integrate metadata metrics such as title, authors, year, journal, abstract, doi, affiliation, with this data will be the analysis of information.

Once the potential studies are obtained, a further evaluation should be conducted to determine their relevance to the study topic. This assessment should be based on the selection criteria defined in the protocol section.

Conduct traditional research to procure articles in order to identify the terms that are most appropriate for search; this determination should be validated by at least two researchers who are experts in the field.

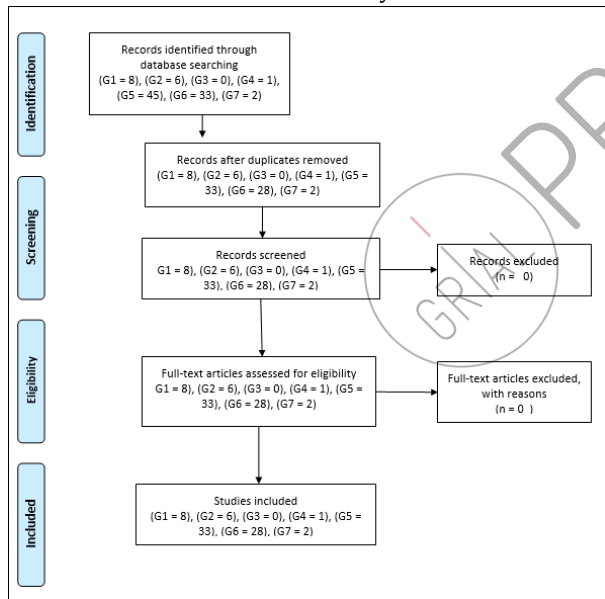


Figure 1: Studies’ representation with Prisma diagram flow

The results of the search in the selected databases are presented in Fig. 1. and Table 3.

Table 3. Total studies of search of selected database.

Group	WOS	SCOPUS	Total
G1	1	7	8
G2	0	6	6
G3	0	0	0

G4	0	1	1
G5	3	30	33
G6	2	26	28
G7	0	2	2
	6	72	78

To identify the author's clearly regarding the groups are represented in Table 4 and Table 5.

Table 4. SLR author's

G1	G2	G3	G4
S1. Diaz	S9. Al-Aidarooos		S15. Karvonen
S2. Feather	S10. Hussain		
S3. Genc	S11. Islam		
S4. Goncalves	S12. Martins		
S5. Ngwenya	S13. Santos		
S6. Schön	S14. Zapata		
S7. Tamayo			
S8. Thompson			

More information:

https://docs.google.com/spreadsheets/d/1_WoG_TLW5qK6Uzv0QpSmvdsUGo3UulOnm12OaC9EB4/edit#gid=1349791246

Table 5. Ux an UE author's

G5	G6	G7
S16. Adamides	S49. Allison	S77. Adewumi
S17. Ahmad	S50. Betz	S78. Lavrov
S18. Alarifi	S51. Calumby	
S19. Alhussayen	S52. Cimino	
S20. Anganes	S53. de Matos	
S21. Argyle	S54. Favario	
S22. Brock	S55. Grant	
S23. Campos	S56. Huang	
S24. Chang	S57. Iribarren	
S25. Dingli	S58. Kannammal	
S26. Falcao	S59. Keba	
S27. Fazal	S60. Liu	
S28. Friess	S61. Lu	
S29. Harrati	S62. Ma	
S30. Jang	S63. Maloney	
S31. Lacerda	S64. Millard	
S32. Lee	S65. Mkono	
S33. Lestari	S66. Noor	
S34. Lindgaard	S67. Palomera	
S35. Manzoor	S68. Power	
S36. Melnick	S69. Ruiz-Iniesta	

S37. Melo	S70. Saha
S38. Olaverri	S71. Sánchez-González
S39. Olsina	S72. Teel
S40. Sánchez	S73. Volentine
S41. Sang	S74. Xu
S42. Savioja	S75. Zhang
S43. Sivaji	S76. Zuiderwijk
S44. Tan	
S45. Triberti	
S46. Wozney	
S47. Wu	
S48. Zhang	

7 DEVELOPING A DATA EXTRACTION STRATEGY

A study's data extraction strategy is developed in an effort to provide a set of possible answers for each previously defined research question. An analysis of the study area's keywords and a search of databases using the "AND" operator will allow researchers to quantify the related studies and uncover answers to the research questions.

Results should be exported to Excel to facilitate the accurate selection and evaluation of data and to develop statistics according to the inclusion/exclusion criteria.

8 SYNTHESIZING, ANALYZING AND PRESENTING DATA

During this stage, we summarize the results obtained from the included primary studies. This summation can be descriptive (non-quantitative) in nature, though it is also possible to provide a descriptive synopsis within a quantitative summary.

With regard to this study, the following results were found upon completion of this summary.

To quantify the information gathered by the two databases, the countries with highest number of studies that conducted research, the reports from the last six years and published reports of literature scientist who have published the greater number of articles in the field of the user experience, usability evaluation on focus the repositories.



Figure 2: World map for the studies

Regarding the selected studies, the countries that have user experience studies applied in Repositories the most representative are USA, Spain, China, Australia, Brazil, Malaysia, Canada, Germany and Finland (see Fig. 2).

Fig 3. shows the journals that predominate in the publication of articles referring to the present topics. The eight most representative journals that have published user experience studies with usability assessment are: Journal of Medical Internet Research (4), Computers in Human Behavior (3), Procedia Manufacturing (3), Information and Software Technology (2), Journal of Biomedical Informatics (2), Journal of Web Librarianship (2), Multimedia Tools and Applications (2), Universal Access in the Information Society (2) and see the complete list in the database on google sites. The journals described cover 20 of the studies, the remaining 58 studies are different journals they aren't repeated.

Finally, in Fig. 4 a distribution of the publication years is presented.

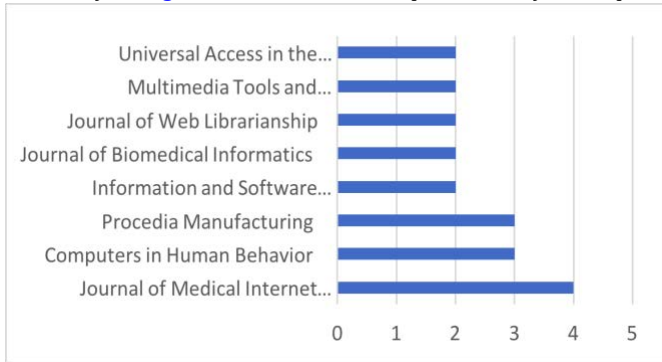


Figure 3: Journals that predominate in the publication of articles.

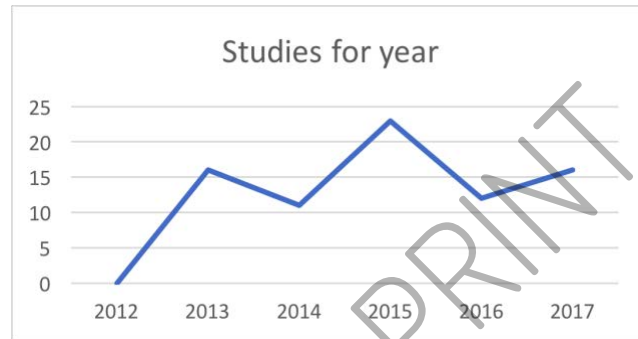


Figure 4: Graph of studies per year.

9 REPORTING STAGE

RQ1 - How many studies have been done to evaluate the usability of a Repository?

In terms of this research question, our aim was to investigate what types of tools are used and how they are utilized for measuring the repository evaluation. We found two studies about the usability evaluation for the repositories and one studies of systematic review of literature on usability evaluation and repositories (see Table 6).

Table 6. Results about RQ1

#	Results
S77	The results from the analysis of the usability attributes show that for all the attributes considered, each scored well above 4.00 on a scale of (1-5) which represents good usability. In essence, the results show that the current web version of the repository provides good usability when accessed from a range of mobile devices. The novelty of this work is that it presents a case study of mobile access to Institutional Repositories in an elegant and repeatable way.
S78	The repository is limited in resources on the development of special software for evaluation of e-learning modules; - is forced by the need to reduce the cost of expertise to be limited to considering only the main quality indicators that have the greatest impact on the ergonomics of e-learning modules.
S15	ARE practices can contribute to improved efficiency of the development process. Moreover, release stakeholders can develop a better understanding of the software project's status. Future empirical studies should consider the comprehensive reporting of the context and how the practice is implemented instead of merely referring to usage of the practice. In addition, different stakeholder points of view, such as customer perceptions regarding ARE practices, still clearly require further research

RQ2 - How many studies have been done to use the approach the user experience on repositories?

Concerning this research question, we analyzed the included studies in terms of methodologies that are used to repositories from the user experience perspective. We found 28 studies in the G5 about the user experience for the repositories and there aren't studies of systematic review of literature about the user experience in the context the repositories (see [Table 7](#)).

Table 7. Results about RQ2

# Studio	Results
S49	High-capacity repositories are being used to house lesser-used collections and make room for user spaces. Attention is being given to the needs of those with disabilities, as libraries strive to build friendly environments for lifelong learning. This includes making room for learning commons that are conducive to exploration and support research activities that will result in student achievement.
S50	The following paper discusses their approach to user-testing, applying Dan Saffer's framework of microinteractions to how faculty members experienced the repository's self-archiving functionality. It outlines the steps taken to test and refine the self-archiving process, shedding light on how others may apply the concept of microinteractions to better understand a website's utility and the overall user experience that it delivers.
S51	This paper describes basic concepts and reviews state-of-the-art methods on the several research fields that complementarily support the creation of interactive information retrieval (IIR) systems.
S52	This paper reports on unique design elements of the system, progress to date and user experience after five years of development and operation
S53	They employed several UCD techniques, including: persona development, interviews, 'canvas sort' card sorting, user workflows, usability testing and others. Our hope is that this case study will motivate the reader to apply similar UCD approaches to their own software design for bioinformatics. Indeed, we found the benefits included more effective decision-making for design ideas and technologies; enhanced team-working and communication; cost effectiveness; and ultimately a service that more closely meets the needs of our target audience.
S54	presenting both an architecture to integrate different repository systems using the Content Management Interoperability Services (CMIS) API and an integration layer that provides a simple web interface suitable for the needs of both the content creators (teachers) and the users of the contents (learners). Results have been evaluated both quantitatively, i.e., using performance indicators such as response time, and qualitatively, on the basis of the user experience evaluated through a questionnaire.
S55	The data gathered were organized into 5 domains: website ownership, visual and textual content, user experience, hyperlinking, and social interactivity. Results: The study found that the 2 provaccine websites analyzed functioned as encyclopedias of vaccine information. Both of the websites had relatively small digital ecologies because they only linked to government websites or websites that endorsed vaccination and evidence-based medicine. Neither of these websites offered visitors interactive features or made extensive use of the affordances of Web 2.0.
S56	The growing popularity of mashup components enriches functionality and user experiences, while the possible connections among components are complex and difficult to mashup developers, who might be non-professional programmers or even end-users, as actions over one component may have potential impacts on another. This paper proposes a novel approach for recommending developers in terms of navigation and completion of mashup components with a large-scale components repository.
S57	The results of this review can serve as a resource for researchers and healthcare professionals wanting to integrate

	TMI into health interventions. Steps to identify, compare and assess advantages and disadvantages are outlined for consideration. Expanded evaluation criteria can be used by future researchers. Continued and more comprehensive platform tools should be integrated into mHealth repositories.
S58	Recommender system is being widely used to recommend products or items to consumer. This system can also be used to recommend a service or a list of service to service requestor. Collaborative filtering technique (CF) is one the efficient recommending system that recommends the service based on the past users experiences or ratings on that service.
S59	In order to enhance user experience and maximize productivity, the development of the LibraryLearn video platform helps to overcome issues regarding usability, accessibility, and incompatibility in order to provide students with "on demand" library instruction
S60	We then propose a supervised machine learning approach to model these factors for question popularity prediction. The experimental results show that our proposed approach can effectively distinguish the popular questions from unpopular ones in the Yahoo! Answers question and answer repository.
S61	They deploy the Browse-to-Search system on tablet devices and evaluate the system performance using millions of images. We demonstrate that it is effective and efficient in facilitating the user's exploratory search compared to the conventional image search methods and, more importantly, provides users with more robust results to satisfy their exploring experience.
S62	The results show that, with intensified commercial involvement, the majority of issue reporting tasks would be undertaken by commercial developers, and issue resolution time would be reduced, implying a better user experience. We hope our methods and results provide practical insights for designing an efficient hybrid development process in the Internetware environment.
S63	Students perceived online repositories as a potential tool to support lifelong learning and health care delivery. Conclusions: The results of this study indicate that today's health professional students welcome the benefits of online learning resources because of their convenience and usability. This represents a transition away from traditional learning styles and toward technological learning support and may indicate a growing link between social immersions in Internet-based connections and learning styles. The true potential for Web-based resources to support student learning is as yet unknown
S64	conclude that in the case of HumBox invisible technology coupled with the social framework of co-design and user engagement activities, has allowed a diffusion of ownership, and created a safe social and technical environment where the community can debate high-level issues, and that this has led to changes in both professional and pedagogical practice.
S65	The glean the implicit uses and gratifications users seek from using the media. It is argued that the combined enactment of these roles creates a rich repository of experiential narratives that tourism businesses and destination managers can tap into for insights into the modern tourism consumer
S66	A number of techniques are chosen to complement the system This new environment improves availability of the application as well as provides autonomous recovery that will not affect user experience.
S67	We take advantage of this tagged set and of massive unlabeled material for exploiting two state-of-the-art single-view semi-supervised approaches aimed at discriminating informational from non-informational how-to content. Moreover, our proposed models leverage assorted linguistically-motivated features, such as sentiment analysis and dependency parsing as well as named entity recognition. Our outcomes show that attributes, harvested from morphological and sentiment analysis, proven to be effective under a semi-supervised framework.

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- S68 They identified the phases of archaeologists work in online archives, which are distinctive to this user group. The insights from this work drove the design and evaluation of an interactive system that successfully integrates content-based image based retrieval and improved metadata searching to deliver a positive user experience when working with online archives.
- S69 The results of an experimental analysis of the strategy's performance are presented. These demonstrate that the proposed strategy offers a high level of personalization and can be adapted to the user. An application of the strategy to a repository of computer science open educational resources was well received by both educators and students and had promising effects on the student performance and dropout rates.
- S70 Our overall results suggest that a significant number of long lived bugs may be minimized through careful triaging and prioritization if developers could predict their severity, change effort, and change impact in advance. We believe our results will help both developers and researchers better to understand factors behind delays, improve the overall bug fixing process, and investigate analytical approaches for prioritizing bugs based on bug severity as well as expected bug fixing effort.
- S71 Face validation of TELMA reveals the positive perception of surgeons regarding the implementation of TELMA and their willingness to use it as a cognitive skills training tool. Preliminary validation data also reflect the importance of providing an easy-to-use, functional authoring tool to create didactic content. Conclusion: The TELMA environment is currently installed and used at the Jesús Usón Minimally Invasive Surgery Centre and several other Spanish hospitals. Face validation results ascertain the acceptance and usefulness of this new minimally invasive surgery training environment.
- S72 She gave examples illustrating the inconsistent treatment of serials in the Stanford Digital Repository (SDR) and described a conceptual model for serials in the SDR to provide an improved user experience finding and accessing digital serial content.
- S73 Another usability test was performed of the DataONE's ONEDrive to assess user impressions as the tool was in development. Six participants were shown a wireframe of the tool and asked for their feedback. This paper proposes to examine the results from the ONEMercury and ONEDrive tests and draw implications for libraries and other data providers wishing to implement and utilize usability practices and principles.
- S74 In theory, the RL interview continues until the user indicates that they have what they need from the librarian so as to conclude the current search. In practice, the NAEP Mother/Child problem block and reference librarians approach the negotiation of learning through prior knowledge, use of technology and strategies, and have an aesthetic outcome.
- S75 Central was satisfactory but also indicated a number of usability issues. Participants had difficulty inputting metadata such as resource type and author information when submitting an article to the repository. There were also interface design issues regarding layout and consistency. It is expected that findings from this study and the evaluation methodology can be extended to the development and evaluation of similar research repository systems
- S76 The infrastructure elements improved OGD use by better enabling searching, analyzing, visualizing, discussing, giving feedback on, and assessing the quality of open data. Hence, we plea for integrating metadata, interaction mechanisms, and data quality indicators in open data infrastructures to advance open data usage.
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RQ3 - What are the dimensions and tools used for to evaluate usability?

On one hand, we analyze what kind of contexts the usability evaluation and the perspective of the user's experience are being studied. On the other hand, our aim was to know which tools are used for the involvement.

Table 8 shows the dimensions by the group G5 in which the 28 studies were classified.

Table 8. Results about RQ3

Dimension	Studies	# Studies
Computing and software	S18, S20, S23, S24, S25, S26, S28, S33, S35, S38, S40, S44, S45, S47, S48.	15
Education	S19, S29, S30, S34, S37, S43	6
Medicine	S22, S31, S36, S46	4
Telephony	S17, S27, S39, S41	4
Engineering	S16, S32	2
Meteorology	S21	1
Sociology	S42	1

The tools are important in evaluating usability in the evidence and results of the studies presented. The instruments that were used to evaluate usability in the respective areas are presented in Table 9.

Table 9. Tools for G5

Dimension	Tools
Computing and software	Observation Questionnaires Heuristic evaluation Reports Demographic survey Confidence survey Exploration tasks Open question Usability rating
Education	Questionnaires Adhesive notes
Medicine	Test Structured and semi-structured interviews Questionnaires Performing tasks Surveys Video recording

Telephony	Interviews Methods of observation
Engineering	Objective metrics Questionnaires Study of cases

Table 10 shows the dimensions by the group G6 in which the 33 studies were classified.

Table 10. Dimensions by the group G6

Dimension	Studies	# Studies
Computation y software	S53, S56, S58, S60, S61, S62, S65, S66, S67, 70, 75, 76	12
Education	S49, S54, S59, S63, S64, S69, S72, S74, S50, S51	10
Medicine	S52, S55, S71	3
Sciences	S73	1
Archaeology	S68	1
Telephony	S57	1

The studies about of the evaluation of the repositories, two dimensions stand out: computation and software and education. In the Computation and Software dimension, the S53, S56, S60, S61, S62, S65, S66, S67, 70, 75, 76 studies used historical records of repositories, exploratory analysis, tasks to explore the system, Open questions about your experience and qualification of usability. The dimension of education, the S63 used an online questionnaire where three focus groups evaluated student feedback and Physeek's self-reported experiences.

For the group G7 only 2 studies were classified with two dimension

The S77 study was classified in the telephony dimension, the instrument used to measure the EPrints repository (Covenant University Repository) is a questionnaire.

Study S78 was classified in the Computer and Software dimension and the instrument used for the evaluation was not shown.

10 RESULTS AND DISCUSSION

The studies about the usability evaluation towards repositories is an unexplored field, so it becomes innovative when incorporating a user-centered approach to design in development methodology. In systematic searches of literature reviews covering usability assessment and user-centered design as a methodology for software development none were found in the Scopus and WOS databases so it is considered an opportunity for Continue to contribute in this perspective to the development of institutional repositories and thus make available the open knowledge through platforms thought of the needs of those who seek and deposit information.

According to [11] the integration of User-Centered Design (UCD), are applied with the aim to deliver competitive products with a suitable User Experience (UX). Therefore, stakeholder and user involvement during Requirements Engineering (RE) are essential in order to establish a collaborative environment with constant feedback loops. [9] the inquiry method was the most frequent in this review, followed by the test method, the inspection method and, finally, the controlled experiment method. A combination of methods is relatively common, especially the combination of test and inquiry methods, probably because the use of the two allows to collect quantitative and qualitative information contributing to a more complete assessment.

The clear needs for more researches to increase both the number and the quality of studies that can be focused on the research gaps identified by this systematic review related to: outcome validation; cultural issues consideration; user interfaces of mobile applications and websites; semiotics perception in usability evaluation; and further improve the value and applicability of research

ideas [6]. For practice, the review showed the significance of semiotics in user interface design and usability evaluation to develop users' intuitive interfaces for boosting the system's usability.

Usability evaluation provides developers and educators with the means to understand user needs, improve overall product utility, and increase user satisfaction [1]. Adopted user-centered design process to develop the concept model and usability concept to evaluate it. The usability evaluation was conducted using a Telehealth indicators dataset. Data were collected through observation technique and with the help of usability questionnaires. Data analysis was based on quantitative and qualitative approaches. In order to determine what kind of techniques can be used in a context the possibilities of application of the tools to do the evaluation should be considered. In our context, it is necessary to know the additional implications to the context of a usability evaluation and to determine the profiles of the users involved to apply a personalized instrument and to know the perspective of each one [4]. With the goal of providing better possibilities of use in an effort to integrate design interfaces as potential tools for researcher this study could have been part of the principles of user-centered design.

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Appendix. List of all primary studies registered in this study classified into groups

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No studies found

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