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Bibliometrics analysis and research profiling to solve user experience overload information

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Abstract
Today's technology is not just a tool to help humans perform complex tasks but has an impact on the revolutionary changes in human thought and behavior as well as culture and societal civilization that we need to know and follow, such as the current development of UX design, UX is a type of work-related to how to increase the satisfaction of application users and site visitors seen from the value for benefits, also the pleasure that the user gets from an application or site. UX is also a pattern that requires the industry and researchers to think that the human factor is more than just maintaining the user's functional needs, moreover, UX brings the concept that the user is a user. UX research is needed on the relationship between systems and interactive experiences learning about cross-disciplinary research experiences using large-scale research profiling studies and bibliometric analysis. People who use systems experiences are becoming more and more important, and because of this, interactive technologies are becoming more and more important in these experiences. Research studies show that the number of publications is growing rapidly indicating a growing scientific interest in experiential research.

1. Introduction

Human interaction in the current digital era has greatly increased in accordance with complex human needs, with the increasingly digital era, the maturity of internet technology has become a very prominent sign [1]. Today's technology is not just a tool to help humans perform complex tasks but has an impact on the impact of revolutionary changes in human thought and behavior as well as the culture and civilization of society that we need to know and follow, such as the development of UX design today [1]. Human-Computer Interaction (HCI) or better known as Human-Computer Interaction is a field of science that studies how humans interact with computers and other types of technology [2].

The concept of UX is mentioned in1995. UX stands for User experience and is a type of work related to how to increase the satisfaction of application users and site visitors in terms of use-value [3], benefits, as well as the pleasure that the user gets from an application or site [4]. UX is also a pattern that requires industry and researchers to think that the human factor is more than just maintaining the functional needs of users, moreover, UX brings the concept that users are humans who use the system [5]. UX is a tool to measure the system to ensure that the system achieves usability, reliability, scalability, and maintainability before it is delivered to the user. UX concept has drastically improved since the era of mobile technology [6]. UX as the focal point of the digital industry has grown to be an important factor in delivering products to customers [7]. UX has always been associated with software design and presentation. For example, people are aware of how mobile apps look and how responsible apps are with different operating systems [8]. Researchers believe that UX increases the efficiency of organizational products in the industry [9]. In addition, development costs for the industry may be reduced when customers are introduced to a product [10]. Some methods such as User Center Design (UCD) place the customer integrated with the product. The customer has considered the functionality of the product while the developer is presented in the design [11]. Improving UX in the industry leads researchers to a large number of scientific publications. However, this upgrade creates an information overload problem [12]. The problem becomes bigger in the structure of the UX field because of the breadth of UX from computer science, social science, medicine, psychology, and mathematics. The researcher introduces several solutions to the information overload problem such as systematic reviews, literature reviews, primary quantitative and qualitative papers, and the gray literature [13]. Moreover, this solution bridges the gap between knowledge transfer and exchange activities. However, qualitative methods such as literature review are subjective and carry a risk of bias [14].

Spend your money on experiences rather than things. Experience matters more and more, and because interactive technologies play a bigger part in these experiences, UX research is required to understand how systems and interactive experiences interact [15]. UX researchers also reference work from other disciplines that explore experience because HCI is heterogeneous in nature. But a thorough analysis is necessary to grasp the depth of cross-

disciplinary research experience [16] [17]. What are the disciplines and fields of study that examine experience, and how are they related, should be our first order of business? What is the foundational text on the human condition? Who are the leading authorities in this field, and where is the experience knowledge located?

Information Overload can be interpreted as excess information that is accessed at one time so that it cannot be processed properly. According to Miller's law, humans can only store pluses and minuses in Completing tasks or making decisions [18]. This will hinder the decision-making process, resulting in poor (or even non-existent) decision-making. When designing a product (e.g., a website or app), the designer must take great care to ensure the researcher prevents information overload from affecting the users of the App/website [19].

Previous research has studied several literature reviews related to cross-disciplinary experiences. Gómez-Corona and Valentin [20]. Carry out non-systematic literature analysis of user experiences, products, drinking, and eating. While the 4 selected experiences cover various disciplines, the authors focus their review on the consumer studies literature. They conclude that, because consumers will continue to focus on emotions and meanings, the concept of experience must grow more specifically in dealing with physical characteristics, interactions, and consuming various types of products [20]. Learn about cross-disciplinary research experiences using large-scale research profiling studies. Research studies show a rapidly growing number of publications indicating a growing scientific interest in the experiential research [21].

Hussein [22] in his study used PAR and grounded theory and an evaluation stage was developed to assess UXD practice in the industry. The study was conducted between a community of UXD practices. The proposed stages incorporate implicit, and explicit design practices as well as practice limitations [22]. The closest overview of our multidisciplinary experiential research analysis originated from Ives et al [23], who examined the literature in the vicinity of the transdisciplinary Human-Nature Bond field. They assert that the social sciences are principally responsible for the research on experience in this area. Which fields have experiences that are not part of the Human-Nature Bond are unknown. While Ives et al say that the Human-Nature Bond experience has been studied by [23], our review focuses on all types of experience and covers a much wider spectrum of disciplines [24].

The article Studying the problems across disciplines literature helps researchers to understand the position of user experience in research related to experience maps, identify relevant works, learn from human experience, adapt existing methods and research dimensions to study human experience, and thus, speed up the maturation of UX research [25]. The urge to say the big picture of experiential research led researchers to tackle the daunting task of mapping experiential research across disciplines.

This study informs the results of efforts to map cross-discipline research experiences. Profiling research was selected as a method because it can broaden the range of knowledge by linking efforts in all research domains [26]. The volume of experiential research has increased, which disciplines engage in experiential research, the locations of experiential research centers, the most active or influential experiential researchers, the publications that experiential researchers most frequently cited, and the field-related nature of experiential research may all be addressed by this. Following, we explore the methods for profile research and explain the findings of the research we conducted using a number of tables and scientific visualizations.

2. Materials and methods

This study uses the research profiling process method and is combined with bibliometric analysis. research profiling is a method popular with modern search engines and scientific information bases (ibid.) written in Judit Bar-Ilan's research [27]. For the research material used, this article uses research from IEEE, Taylor and Francis, ScienceDirect, MDPI, ACM, Mendeley, SpringerLink, and Google Scholar with categories of journal articles and proceeding articles. The profiling research method has been applied previously in various bibliometric research. The amount of bibliometric information analyzed generally varies from a few hundred to several thousand. Another example of large-scale analysis is the research of Roto et al [21] which depicts a global science map using all research published in 2021 as indexed on the Website of Science. The process of making profiling research begins with using six stages to solve information problems in the UX field. Topic Identification, Selection information, Search refinement, Data retrieval, Data cleaning, Representation, and interpretation. For an explanation of the process of completing the profiling research:

a. Topic Identification. Identifying the topic for the first time focuses on the research term “User experience” which is not really about User experience design and interaction. To eliminate this problem, we perform data cleaning in step five.
b. Selection information. For the Selection information process, a thorough database search from IEEE, Taylor & Francis, ScienceDirect, MDPI, ACM, Mendeley, SpringerLink, and Google Scholar was carried out to retrieve and analyze articles from journals and conferences in the period 2006 -2022.
c. Search refinement in this process is done to refine the search by filtering UX words based on articles.

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d. Data retrieval in this step using the search facility on each website and the Publish or Perish software. At MDPI, Taylor & Francis, IEEE, and ScienceDirect we use RIS as the data format for export, for ACM we use BibTeX, and for others, we use Publish or Perish with RIS data.
e. For data cleaning in this step, we incorporated the Zotero reference manager. First, data is imported into Zotero, and for each article, we manually check for the information provided. In this writing, data are needed such as Item type, Title, Author, Abstract, Publication, Volume, Page, Date, Journal Abbreviation, Language, DOI, ISSN, and URL. Finally, in each article, we remove articles that are not closely related to UX. For example, the article in this paper is not related to UX but the search engine on the website provides this article as relevant to UX. In this step, we removed 245 articles.
f. Representation and interpretation at this stage the data in the Representation as tables and graphs are interpreted as descriptive.

In this article, we use the bibliography as our dataset which is compiled as a RIS document. In the final procedure of our research, we used interpretation and description. For interpretation, we use a bibliographic coupling network [28]. Coupling networks can be constructed for the different analyzes we use in this publication. There are several uses of a coupling network such as the interpretation of publications, journals, researchers, and topics. To create a bibliographic coupling network, we explore Equation 1 [28].

$$v_{ij} = \sum_{k=1}^{M} C_{ik}\, C_{jk} \tag{1}$$

Where is a fully calculated bibliographic matrix between the researcher and subscription used VosViewer it is a free and continuously developing scient metric tool that has been implemented in thousands of scientific journal publications.

3. Results and Discussion

This article includes all publications that mention experience in the field of UX Design, and the first such publications appeared in the 2006s. First published in the group data by Roto et al. [21] this article is about “cross disciplines with 3W”, published in 2021. Researchers share the results of the volume of publications, disciplines, research centers, prolific writers, as well as experiential research publications that are widely published in all research fields. The final section maps out the ties between disciplines.

3.1 Experience Publication Volume

The bibliometric analysis of our articles covers 17 years from 2006 to 2022 and includes 308 publications with experience in the field of UX Design. Almost 60% bibliometric analysis has become popular for solving subjective and biased knowledge. Bibliometrics can combine author, abstract, and keyword information. Researchers mostly combine qualitative and quantitative methods with the largest published data set. This method is also popular for mapping UX research. There are advantages to using this method. First, it represents the quoting behavior. Second, mapping related to research. The last one is a show of getting involved in the UX field. In this paper, our research aims to identify the UX of the 4W questions (what, why, when, who) and map the field of UX across a broad disciplinary area.

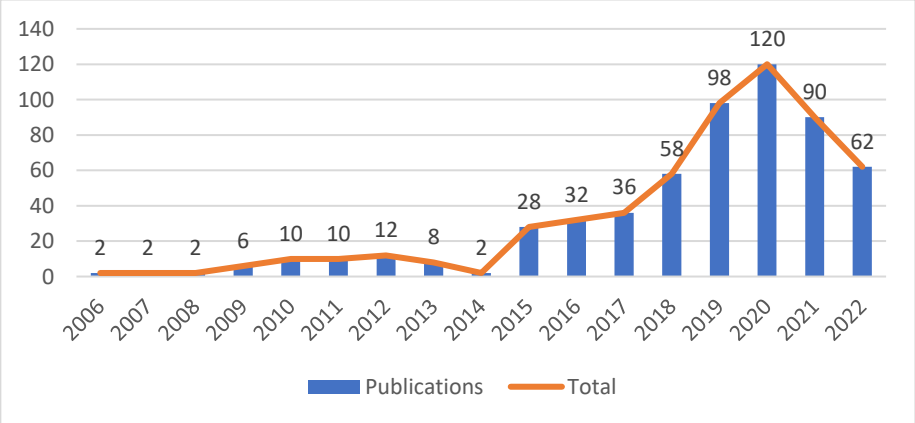

Figure 1. Number of Annual UX Publications

Table 1. The Number of Publications and Dataset Range

Source	Σ	Range Years
IEEE	32	2006-2022
Taylor Francis	15	2006-2022
ScienceDirect	46	2006-2022
MDPI	30	2006-2022
ACM	32	2006-2022
Mendeley	288	2006-2022
SpringerLink	30	2006-2022
Google Scholar	111	2006-2022

This paper was compiled from several sources from the range years 2006-2022 as shown in Table 1. Figure 1 shows the increasing number of published literature articles in journals and proceedings. In this paper, we compare several publications from popular publishers. A slight increase in the number of publications in the last 17 years from 2006. Articles from 2015 to 2021 represent half of the dataset's total literature; this period was the most productive year for UX. When we talk about the most cited achieved by the article from IEEE talks about 5G technology to improve UX [29]. The significant volume of publication experience from 2006 – 2022 by showing the increasing growth of publications. The increase in publications in 2015, in 2020 the peak of the increase of publications.

3.2 Topic Analysis and Co-Occurrence

Figure 2 shows the analysis co-occurrence in terms of the topic "user experience" and its network of links (links) in each correlation with each other. In this paper, the previous variable is used for the threshold [30]. To display five topics, these keywords show how often each keyword appears in the article. Each keyword represents a topic in UX. The threshold is also relevant to the network representation. When we talk about Figure 2, User Experience has a large bubble size, indicating that User Experience is the most popular keyword in the data set. Topics are close related to each other in links, links close means the two topics have a strong relationship. Color representation means cluster, the individual clusters resulting from the presentation are coded according to keywords.

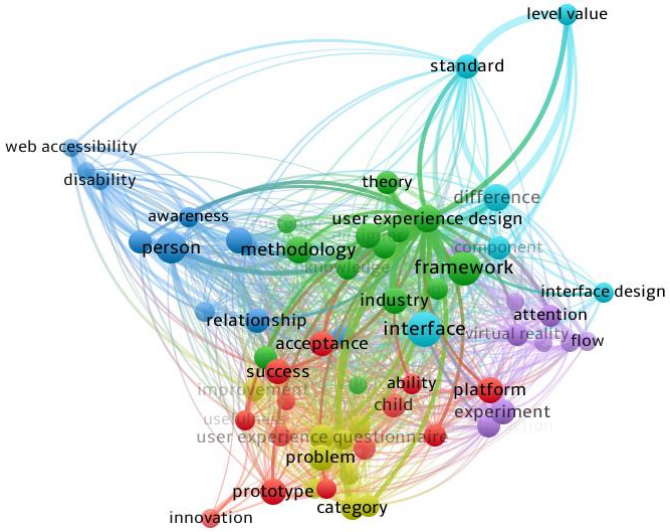

Figure 2 Publication Map

Each cluster can be connected to other clusters based on links that represent a correlation. For example, in Figure 3, when we have a dialogue about assessment in a collection of information that is closely related to Paper, User Experience, Study, Application, Experience, Usability, Research, and System. With this shared event analysis, the data overload problem can be solved. Researchers identify related topics based on links and subjects. Table 2 shows the highly linked keywords in open-source posts at IEEE publishers. This open-source post is very interesting because with this type people who do not have access can easily download it. In this paper, we do not have a correlation dialogue about closed-source and open-source, but the correlation between these two types is related to keywords.

In this article, we use 5 clusters to separate keywords in the dataset, but in this result, it is very important for the IEEE dataset cluster number 5 far from other clusters. Clusters in this dataset are sourced in color, green represents the main cluster user experience, blue represents the cluster user experience with the application, red color represents

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the user experience with the system and yellow color represents the user experience with the user. This study aims to identify the UX of the 4W (what, why, when, who) case. Linked to the results of our study. The first thing is What. From the clusters, in Figure 3 we clearly identify what topics are relevant to the user experience and what topics are linked to them. The case of information overload exists because there is so much data without relevant data, Moreover, these cases usually occur when researchers find solutions that apply to the topic of user experience. By analyzing bibliographical and interrelated topics, researchers have relevant topics and literature. The second thing is why. Sometimes, the term user experience is used in a broad context, for example, the articles field [31] is not related to user experience in the context of design or user/human aspects, but from the website search engine in the publisher which is displayed as a result of user experience. This problem may occur because of the accuracy of the search engine. In this research, we removed 245 articles that were not related to the topic. The third problem is when. From Figure 1 we recognize that 2018 was a year of user experience as interpreted in Figure 1, in 2018 there were 58 publications. The last issue is who. From Table 3 we recognize that the topic is not only direct to user experience but from the context of posts to improve reliability and human aspects in user experience.

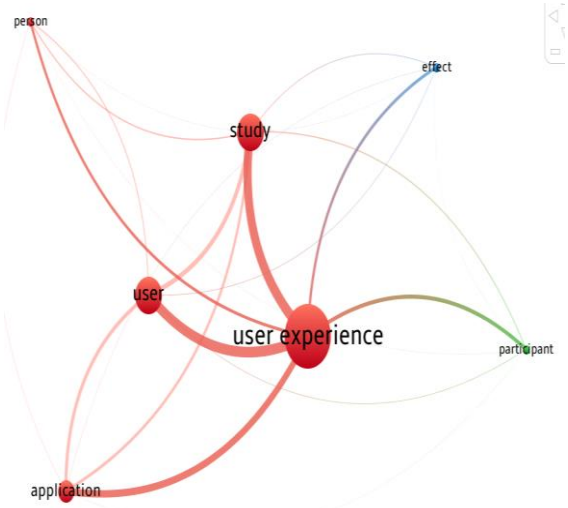

Figure 3. Example of Related Topics

Each paragraph consists of one main sentence and several explanatory sentences. The explanations should be delivered systematically and provide information about how the authors do, related to data, methods, or stages that were conducted.

3.3 Learning Discipline experience

From the collection of information, we have, slightly more than 35% of publications are categorized in Mendeley 35%, 25% in the Google Scholar category, 20% are listed in the ScienceDirect category, 17% in IEEE and ACM categories, 13% in MDPI and SpringerLink categories and a small number in the basis of species that is Taylor Francis 9% (see Figure 4). The distribution of this experience publication is in line with Roto et al [21], whose analysis of the literature created Mendeley's premier publication of human experience (Figure 4). Research starts from the experience dominated by Mendeley.

From Figure 4, there are several percentages, there are high and low percentages, for the highest data with 288 Records published in Mendeley and with a percentage of 35%. For the lowest data with Records which amounted to 15 published in Taylor Francis Publications and with a percentage of 9%.

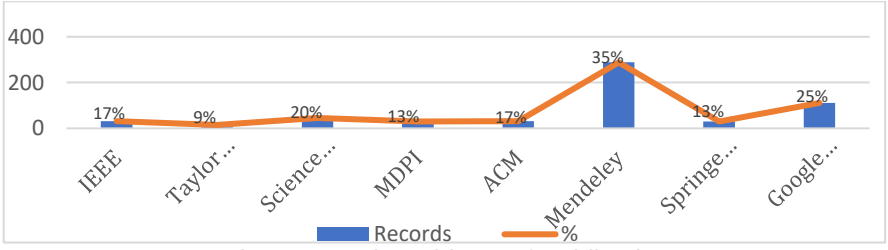

Figure 4. Main Subjects of Publication

Table 2. Most Related Keyword

Ranks.	Topic	Links	Total Link Strength
1	User experience	232	378
2	Study	165	193
3	User	145	146
4	Paper	84	92
5	Application	72	81
6	experience	95	77
7	Usability	65	72
8	research	78	64
9	System	82	59
10	Product	48	57
11	Need	52	56
12	Analysis	51	48
13	Context	41	43
14	Approach	61	34

Link is a connection or a relation between two topics for example bibliographic coupling of the topic “user experience” between publications. In addition, each link has a strength represented by a positive value. Indicate the number of the cited article. The higher value is seen in Table 2 there are 14 ranks, and from Total Link Strength there is the highest total which is in Topic User experience at Rank 1 with a total of 378 it means that that topic was cited by other documents, and there are 232 links. From this data, there is a Median which is at Total Link Strength 72 and 64, which is on the topic of Usability and Research which is at rank 7 and 8, and there are 65 and 78 links. For the lowest data, there are 34 Total Link strengths. The Approach topic is at Rank 14 with 61 links. The highest total link strength value means that that topic is significant and relevant to the bibliographic analysis.

3.4 Research Center Experience

Due to the number of publications on the user experience topic, we make inclusion rules to create a research center experience based on the relevant source and article. We include articles that contain “user experience” in the title and abstract, written in English, have a full document, subject of the journal must be computer science. From that inclusion criteria, we get ten ranked articles based on the most cited article as shown in Table 3. The perspective of the publication commonly gets higher citations when the article goes old and more than ten years. From this research, we also need the point of view from the article in the range last five years. The last four titles in Table 3 are the last five years' articles. From the experience of this research center, we have learned that the probability of publication on this topic is as high as its potential impact on knowledge.

Table 3. Most Cited Article

Rank	Title	Source	Citation	year
1	What will 5G be?	[29]	6047	2014
2	Integrative Genomics Viewer (IGV): High-performance genomics data visualization and exploration	[32]	4693	2013
3	Communication-efficient learning of deep networks from decentralized data	[33]	2673	2017
4	User experience - A research agenda	[34]	1624	2006
5	A Survey on Internet of Things: Architecture, Enabling Technologies, Security and Privacy, and Applications	[35]	1536	2017
6	Gamification in theory and action: A survey	[36]	1119	2015
7	Gamification: Using game design elements in non-gaming contexts	[37]	1021	2011
8	Digital game-based learning: Towards an experiential gaming model	[38]	921	2005
9	What is user engagement? A conceptual framework for defining user engagement with technology	[39]	887	2008
10	Construction and evaluation of a user experience questionnaire	[40]	797	2008
…	Empathy and embodied experience in virtual environment: To what extent can virtual reality stimulate empathy and embodied experience?	[41]	276	2018

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…	Edge AI: On-Demand Accelerating Deep Neural Network Inference via Edge Computing	[42]	215	2020
…	Large-scale order dispatch in on-demand ride-hailing platforms: A learning and planning approach	[43]	203	2018
…	Machine learning at facebook: Understanding inference at the edge	[44]	193	2019

3.5 The Most Popular Journal Publications and Conference Venues for Experiential Research

Next, we complete the review of the number of most popular conferences in Table 4. In this analysis, we count the number of conferences from all publications in our database. Table 4 is based on our database the article from that journal or conference is included in processed research. The most popular journal and conference venues are samples that are relevant to the user experience topics.

Table 4. The Most Popular Journals and Conference Venues for Experiential Research

Rank	Source Title	Journal	Conference
1	Journal of Biomedical Informatics	464	
2	International Journal of Human-Computer Studies	353	
3	Journal of Ambient Intelligence and Smart Environments	243	
4	International Journal of Recent Technology and Engineering	202	
5	Human-Computer Interaction. Design and Development Approaches	189	
6	Proceedings of the Design Society: DESIGN Conference		146
7	South African Computer Journal	105	
8	International Journal of Technology Assessment in Health Care	100	
9	TELKOMNIKA (Telecommunication Computing Electronics and Control)	98	
10	Frontiers in Psychology	92	
11	ACM Computing Surveys	98	
12	Journal of Information Technology Services	90	
13	Journal of Airline and Airport Management	83	
14	ISPRS International Journal of Geo-Information	83	
15	International Journal of Natural Science and Engineering	87	
16	Journal of Information Technology and Computer Science Development	81	
17	JOURNAL OF ECONOMICS AND INFORMATION ENGINEERING	80	
18	Journal of Computer Science (CLICK)	79	
19	International Journal of Computer Theory and Engineering	78	
20	Journal of Multidisciplinary Issues	78	
21	SN Applied Sciences	77	
22	JMIR Human Factors	77	
23	JOURNAL OF UNIVERSITY OF BABYLON for Pure and Applied Sciences	76	
24	Journal of Business Economics and Management	66	
25	Interactive Technology and Smart Education	67	
26	International Journal of Information Management	65	
27	Journal of theoretical and applied electronic commerce research	64	
28	Quality and User Experience	63	
29	Journal of Technical Writing and Communication	62	
30	Journal on Multimodal User Interfaces	62	
31	Journal of Retailing and Consumer Services	61	
32	JATISI (Journal of Informatics Engineering and Information Systems)	59	
33	Journal of New Librarianship	59	
34	Proceedings of the ACM on Human-Computer Interaction		57
35	European Journal of Oncology Nursing	57	
36	Journal of Islamic Economics and Finance Studies	56	
37	Environment International	56	
38	Applied Ergonomics	44	
39	Journal of Web Librarianship	44	
40	IEEE Access	43	

4. Discussion

With the increasing role of interactive technology in these experiences, UX research is needed on the relationship between systems and interactive experiences. Roto learns about cross-disciplinary research experiences using large-scale research profiling studies. Research studies show the number of publications is growing rapidly indicating a growing scientific interest in experiential research. To learn from human experience, adapt existing methods and research dimensions to study human experience, and ultimately hasten the maturation of UX research, this article

Studying the Problems Across Disciplines literature helps us better understand the position of user experience in research related to experience maps.

This could address our concerns about how the volume of experiential research has grown, which disciplines experience experiential research, where the centers of experiential research are located, who are the most active or influential experiential researchers, which publications are the most widely reported by experiential researchers, and how it is a field. related experience research. For the research material used, this article uses research from the IEEE, Taylor and Francis, ScienceDirect, MDPI, ACM, Mendeley, SpringerLink, and Google Scholar with the categories of journal articles and proceeding articles. Another example of large-scale analysis is the research of Roto et al. which depicts a global science map using all research published in 2021 as indexed on the Website of Science. Selection information For the Selection information process, a thorough database search from IEEE, Taylor & Francis, ScienceDirect, MDPI, ACM, Mendeley, SpringerLink, and Google Scholar was conducted to retrieve and analyze articles from journals and conferences in the period 2006-2022. Search refinement in this process is done to refine the search by filtering UX words based on articles. At MDPI, Taylor & Francis, IEEE, and ScienceDirect we use RIS as the data format for export, for ACM we use BibTeX, and for others, we use Publish or Perish with RIS data. For example, the article in this paper is not related to UX but the search engine on the website provides this article as relevant to UX. This article includes all publications that mention experience in the field of UX Design, and the first such publications appeared in the 2006s. The bibliometric analysis of our articles covers 17 years from 2006 to 2022 and includes 308 publications with experience in UX Design. In this paper, our research aims to identify the UX of the 4W questions (what, why, when, who) and map the field of UX across a broad disciplinary area. Articles from 2015 to 2021 represent half of the dataset's total literature; this period is the most productive year for UX. In this article, we use 5 clusters to separate keywords in the dataset, but in this result, it is very important for the IEEE dataset cluster number 5 far from other clusters. Clusters in this dataset are based on color, green represents the main cluster user experience, blue color represents the cluster user experience of the application, red color represents the user experience of the system and yellow color represents the user experience of the user. From the clusters, in Figure 3 we identify what topics are relevant to the user experience and what topics are linked to them. Cases of information overload arise because there is too much data without relevant data, especially these cases mostly occur when researchers take solutions that apply to user experience topics. Sometimes, the term user experience is used in a broad context, for example, articles are not related to user experience in the context of design or user/human aspects, but from the publisher's website search engine which is displayed because of user experience. From Table 3 we recognize that the topic is not only direct to user experience but from the context of posts to improve reliability and human aspects in user experience. From the collection of information, we have, slightly more than 35% of publications are categorized in Mendeley 35%, 25% in the Google Scholar category, 20% are listed in the ScienceDirect category, 17% in the IEEE and ACM categories, 13% in the MDPI and SpringerLink categories and a small number in Based on the type, namely Taylor Francis 9% This distribution of experience publications are in line with Roto et al, whose literature analysis created Mendeley's main human experience publications. From Figure 5 there are several percentages, some of which are high and low, for the highest data with Records amounting to 288 published in Mendeley and with a percentage of 35%. The lowest data with Records amounting to 15 published in Taylor Francis Publications and with a percentage of 9%. As seen from Table 2 there are 14 ranks, and From Total Link Strength, there is the highest total which is in Topic User experience at Rank 1 with a total of 378, and there are 232 links. From this data, there is a Median which is at Total Link Strength 72 and 64, which is on the topic of Usability and Research which is at rank 7 and 8, and there are 65 and 78 links. And from Table 3, can be seen from citation 655 with the topic Personal, Ubiquitous, Computing, Airports, Modems, Roaming, Advances in Science, Technology, Engineering Systems in 2020.

5. Limitations, reliability, and Validity of the Work

There are various limitations that this study could be subject to. The individual representation based on the author's subjective understanding is what makes it the most vulnerable. Additionally, some publications may be included or excluded from this research depending on the researcher's comprehension and the method in which they openly describe the issues. This study might be limited by the web search of the publisher's lack of information. Additionally, both the logical characteristic and the term limitation may have an impact on the outcome. The explanations of the attributes are important because they may not contain all of the attributes that have been previously published and because certain attributes may have overlapping definitions.

6. Conclusion

Today's technology is not just a tool to help humans perform complex tasks but has an impact on the impact of revolutionary changes in human thought and behavior as well as culture and societal civilization that we need to know and follow, such as the current development of UX design, The purpose of the UX is to increase the satisfaction of user application or services. UX is more than maintaining the user needs, is a pleasure that the user gets from an application or service. UX brings the concept that the user as a human using the system experience is increasingly important. This

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research purposed research profiling and bibliometric analysis. The result of this research is to understand the trend in UX research and where they stand in this major. In addition, bibliometric analysis is important to get a broad view of topics that usually have wide and high intersections with the other subject. Overload problems can occur when the researcher does not understand the related topics and close relevant journal and research on that topic. To solve that problem, we used research profiling combined with the result of the bibliometric analysis. Focus on the highest link and total link strength to ensure that researcher goes straight in the right way.

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