Chapter 110

Self-service technologies in the health area: a systematic mapping

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ABSTRACT
The study aimed to analyze the relationship between This study aimed to identify the existing self-service technology services in the health area. It is a Systematic Literature Mapping, in which a search was carried out in December 2021, in the Virtual Health Library (VHL), PubMed, ScienceDirect, Scielo and Web of Science databases. The following descriptors were used: self-service and self-service, with adaptations being required to meet the specificities of the databases. Were identified 1,976 studies and after applying the selection criteria, 43 publications reached the quality level for inclusion and inclusion. The reviewed articles present the relevant questions for the users about the applications. This study is recommended for auxiliary research studies, increasing the quality of mobile applications in healthcare.

1 INTRODUCTION

The quality of the service is one of the main items that provide satisfaction and loyalty, therefore, the organization needs to understand and study the needs and desires of its users (LIMA; MAGELLAN, 2021). With global advancement, new information and communication technologies (ICT) are improved to improve the quality of services through experiences. In the area of health, the application of ICT aims at the safety of the care team and users, the efficiency and effectiveness of teams and reduces organizational expenses. In addition to these factors, the need for simultaneous clinical information exchanges was also responsible for accelerating the implementation of technological resources (RAHIMI *et al*., 2018). The Covid-19 pandemic made it impossible to provide face-to-face assistance, thus, the forms of digital care became evident and essential for the prevention and maintenance of global health. In order to achieve the objectives of technological implementation, the organization initially needs to analyze the proposal of the service and the profile of its customers (SOUZA *et al*., 2021).

Digital health care means all tangible and intangible resources involving technology, organization and its users, such as medical teleservice, provision of technical support, provision of financial support, provision of support for doubts / information and provision of support for acquisition and alteration of plans and packages. Among all the services mentioned, self-service services receive notorious prominence and

importance, and reflect to what is "produced by the customers themselves, regardless of the direct involvement of the service employee, using a technological infrastructure provided by the service provider" (SCHUMANN *et al.* , 2012). Self-service technologies give the relationship with the customer, increasing the involvement and thus create the potential for greater visibility and integration of service providers in the daily processes of customers (IMMONEN, 2018). According to Oliveira (2017), the study of self-service technologies has gained worldwide interest in recent years and the continuous proliferation of these transmits the need for research that goes beyond interpersonal dynamics around the context of technologies.

Thus, the objectives of this systematic mapping aim to: identify the historical evolution of publications on self-service technologies in health, identify users who use the service and identify which services are used, as well as identify benefits and challenges.

The respective results can help health professionals such as directors, managers and administrators, marketing professionals, information technology professionals (IT) and researchers to carry out strategies of technological applications, in particular self-service, aimed at innovating and enabling communication with their users.

2 MATERIALS AND METHODS

This is a systematic mapping of the literature at the national and international level on the theme self-service technologies in the health area. Data collection was performed from articles published in journals/journals, through a sensitive search strategy.

The objective of the systematic mapping is to verify the relevance of the theme for a research in all bases and places that provide matter on the subject, conforming it until the moment of its realization. It considers what can be found in indexed sources, that is, those available in the Journal Portal of the Coordination for the Improvement of Personnel of Superior Level [Capes] or accessible from databases (the catalog of the Library of Congress of the United States of America) and library services (of the Bibliographic Program (Comut) (PROENÇA *et al.*, 2016).

It is also considered the various formats called "gray literature" that vary from field to field (e.g., articles and contributions in events, technical *reports or blog posts*), whose incorporation and appreciation of the collection of knowledge have been increasingly recognized (ARBOIT & BUFREM, 2011; PEJSOVA & VASKA, 2011; LAWRENCE, 2012). It is also as sources for systematic mapping: groups (associations, professional institutes or university research groups) or school products (dissertations and theses) that contribute to the subject (PROENÇA *et al*., 2016).

Furthermore, *systematic mapping or scoping review is also* used when it is intended to obtain a broad view of a given theme, and not as an in-depth response method of specific themes (MOHER; SHEKELLE, 2015). According to Kitchenham and Charters (2007) this research model prioritizes the classization of the research topic of interest. Similarly, it is generally considered in the management of systematic mappings of research topics that have little scientific evidence in the literature studied.

Nevertheless, it is possible to seek authors and institutions that identify themselves on the subject, that is, in which there is a relationship with a community of scholars, enabling a deepening in the mapping of the theme. In addition, there is the possibility of conducting a topical search, an opportunity in which it is possible to expand the sources of references. Proença *et al*. (2016) consider this process as seeds of reference searches, because, according to the authors, it cannot be guaranteed that such procedures achieve the expected results.

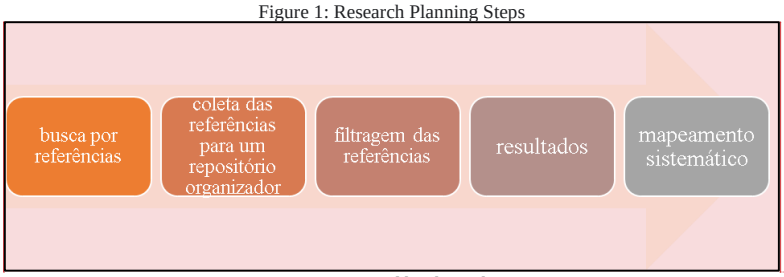
It is understood that the process of identifying sources appropriate to the research is due. Based on the first search through keywords, authors or works in time for the development and improvement of research issues can be reached, which is called seeds in the search for new theoretical foundations (PROENÇA *et al*. 2016). Thus, one can compare the similarities and differences between the references, that is, the works that cite or by which they are cited. Proença *et al*. (2016) state that it is necessary to have documented the criteria of a given reference in order to verify its relevance to the research.

What allows an identification of gaps in the researched area is the final process of mapping, which, in turn,provides future research on the attic, in addition to instructing the researcher through the paths that must be traversed in the research (KITCHENHAM & CHARTERS, 2007; PETERSEN *et al*., 2008; KITCHENHAM *et al*., 2011). Thus, the mapping allows a broad view of the topics and evaluates the subtopics, which deserve attention (PETERSEN *et al*., 2015), in addition to identifying and classifying the categories relevant to the study (KITCHENHAM *et al*., 2011).

2.1 RESEARCH PLANNING

The systematic mapping process involved the following stages, based on the sensitive search for literature (1) search for references; (2) collection of references to an organizing repository - excel; (3) filtering of references; (4) report the results; (5) systematic mapping. As shown in Figure 1.

Figure 1: Research Planning Steps



Source: prepared by the authors

Comentado [IC1]: search for references
Collection of references for an organizing repository
references filtering
results
systematic mapping

It is necessary to define the criterion to be used when planning a systemic mapping. This aims to evaluate and classify the quality presented in the selected works and researches, in order to create criteria for inclusion or exclusion of studies (WOLIN *et al*., 2013). In this case, the application for the structuring of the research and topics is the systemic mapping itself (PETERSEN *et al*. 2015), with the

purpose of classifying the relevance of the literature and expanding studies to the defined areas (KITCHENHAM *et al*., 2011).

In order to achieve the objective of this work, we elaborated the planning with strategies for the search and exclusion of primary articles, described in the following subsections.

2.1.1 Research Questions

Four fundamental questions were elaborated for the investigation of this research, presented in Chart 1.

Chart 1. Search questions for search

What are the technologies found in self-service in the health area?
Which users use self-service technology services?
What are the benefits found in the use of self-service services in the health area?
What challenges have you encountered for the development and acceptance of the use of these services?

Source: prepared by the authors

2.1.2 Search Process

A study of the necessary keywords was carried out with the intention of answering the questions already defined. After that, the PubMed base was selected to serve as an example for *string construction* and to serve as a model to apply to other databases. Thus, with the keywords defined and the base example, *strings have* been adapted to apply to the other selected databases to be part of this review:

Table two. Search *Sources* and Strings for Search

Source	*String*
Web of science	TS=(self-service) OR
Pubmed	(self-service[Title/Abstract] OR ("self service"
Scielo	(TI:(self-service) OR ("self service")) OR (ab:(self-service))
Science Direct	Title, abstract, keyworks: self-service or "self service"
VHL	(ti:(self-service)) OR (ti:("self service")) AND (ab:(self-service)) OR (ab:("self service"))

Source: prepared by the authors

The research was carried *out from the defined Strings* , the search filters were added, in which they are: articles written in the period 2017 to 2021; written in Portuguese, English and Spanish; complete

articles; open and published in journal databases; in the area of health management and in the health technology area.

Table 1 shows the number of publications presented after search for *String* and filters for search.

Table 1. Number of articles found in each source

Web of Science	Pubmed	Scielo	ScienceDirect	VHL
389	346	497	311	433

Source: prepared by the authors

In addition, the following inclusion criteria were added: studies dealing with technologies in the health area; studies dealing with the implementation of self-service technologies in the health area and studies dealing with health applications.

Table 2 shows the number of publications presented after the inclusion criteria were applications.

Table 2. Number of articles found after inclusion criteria

Web of Science	Pubmed	Scielo	ScienceDirect	VHL
263	55	497	19	219

Source: prepared by the authors

2.1.3 Exclusion criteria

The exclusion criteria removed papers that do not fit the objective of this review. In order to offer a selection of specific articles for the analysis of this study, 5 exclusion criteria were elaborated, presented below, according to Quadro 3.

Table 3. Exclusion Criteria

Duplicate articles.
They don't answer any research questions.
Studies published before 2017 and after 2021.
Studies that are not in English, Spanish, and Portuguese.
Studies dealing with self-service technologies in non-health organizations.

Source: prepared by the authors

In a more in-depth reading of the pre-selected articles, it was observed that a large majority of the articles were excluded, considering that self-service technologies were not used in the health area.

Table 3 presents the quantitated articles after the exclusion criteria of each database.

Table 3. Articles included by exclusion criteria

	Web of science	Pubmed	Scielo	ScienceDirect	VHL
Total	8	2	12	8	13

Source: prepared by the authors

After reading and analyzing 1,976 titles and abstracts returned, publications that had the potential to answer the guide questions and met the inclusion and exclusion criteria were pre-selected. There were 43 publications left for full reading.

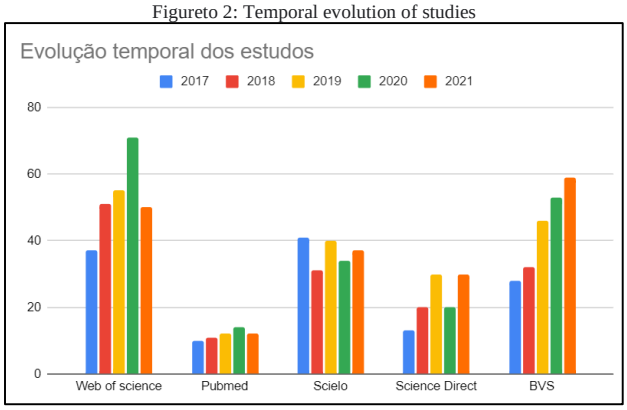
3 ANALYSIS OF RESULTS

This section sought to answer the research questions defined in sub-item 2.1.1. In Appendix A, the selected articles are available with their respective authors, year of publication, scientific basis and purpose of each article.

3.1 TEMPORAL EVOLUTION OF STUDIES

Figure 2 shows the distribution of the articles through the databases chosen in the last 5 years. The data from each database refer to the inclusion criteria described in sub-item 2.1.2.

Figureto 2: Temporal evolution of studies



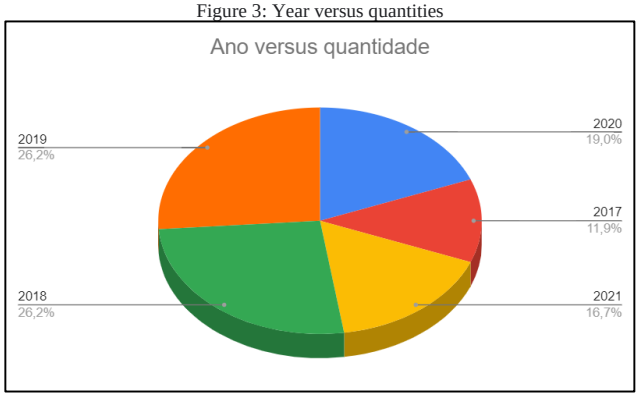
In the figure above we can observe that the databases studied do not present a pattern of evolution between them. In other words, we have identified *that the Web of Science* has been in a growing number of articles published since 2017. In 2020, the same database has a very large volume of articles published on the theme of self-service, but in 2021 there was a reduction of articles, lower than in 2018. PubMed since 2017 has been growing slightly, but when compared *to the Web of Science*, we found that it has been publishing a much larger amount than Pubmed.

Scielo and Science Direct had a higher number of publications in 2018 and 2021. Although Scielo obtained its largest number of articles published in 2017.

The Virtual Health Library (VHL) has increased the publication of its articles on the theme of self-service year after year. In 2017, the database published around 30 articles, reaching almost 60 articles in 2021. Confirming that the subject is becoming increasingly relevant over the years.

The figure in the chart below (Figure 3) shows the percentage of articles found according to the year published:

Figure 3: Year versus quantities

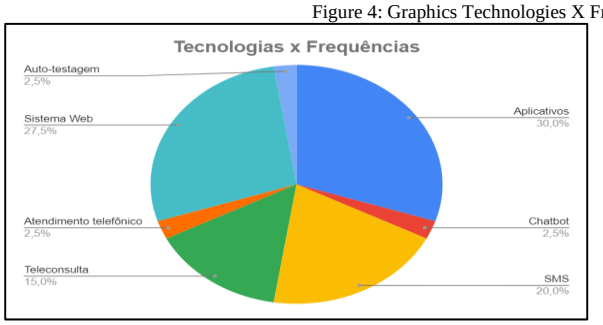


It turns out that publications with the theme self-service technologies for health services are growing from 2017 to 2019. However, in the years 2020 and 2021 these numbers were reduced. It is believed that due to the Covid-19 Pandemic, research has been focused on other relevant health issues. However, self-service technologies are considered a promising field for the future of health.

3.2 TECHNOLOGIES FOUND

Our study pointed out an wide range of technologies where we seek to map them in Figure 4. The chart below shows a list of the technologies addressed in the selected publications, and how often they were used.

Figure 4: Graphics Technologies X Frequencies

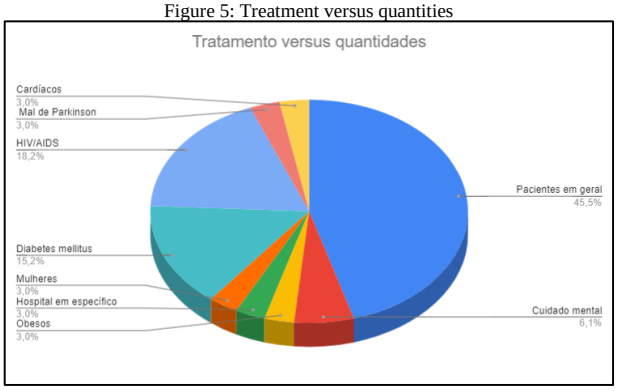


From this graph, we identified that the most used technologies in self-service health services are applications and web systems. Chatbots and teleconsultations have shown a major advance for self-service technologies and acceptance for their usefulness.

3.3 TO WHICH USERS ARE THESE TECHNOLOGIES TARGETED

Of the 46 articles selected, it was possible to verify that the main themes addressed are focused on the use of technologies aimed at HIV/AIDS (6), Diabetes (5), Mental Health (2) , obese patients (1) , patients of a specific hospital (1), female patients (1), patients with Parkinson's disease (1) and cardiac patients (1). The other ones approach the general public in various services, as shown in their percentages in Figure 5. The main proposals of these studies focus on data collection and follow-up related to continuous treatments, patient satisfaction and facilitator of routines.

Figure 5: Treatment versus quantities



3.4 WHAT BENEFITS AND CHALLENGES HAVE BEEN FOUND

It is apparent that the teleconsultation/teleservice modality has become more frequent due to the Covid-19 pandemic, according to these studies. It was found that the acceptance of the use of technologies by users is mostly satisfactory, but there are some groups that require face-to-face training prior to the process for detailed clarifications, especially the elderly.

The articles focusing on Health Education showed good results regarding the creation of autonomy and self-care on the part of patients with chronic diseases. This is done through the clear instructions that are provided daily by the handling of these technologies. In this sense, the importance of the construction of this instruments by people with technical knowledge directed to the problem that will be addressed is demonstrated.

Even in view of the need for better training to the teams, the data collected virtually, if well used, generate a situational monitoring of what, capable of supporting professionals in decision making. In addition, these virtual tools can be a major facilitator of bureaucratic processes in health services. However,

there is still little information directed to cost reduction in the implementation of self-care technologies in health.

There are reports of concern about privacy on the part of users, as well as complaints due to problems with access to applications and available infrastructure. It was also pointed out the importance of recycling these *proposals using increasingly advanced software* and greater interaction, being an example the replacement of SMS by *Whatsapp*.

4 FINAL CONSIDERATIONS

The health area is becoming increasingly complex, technological and strategic. As observed in this research, increasing technological innovations have been studied and used in hospital organizations, especially the system of self attendance. This system has gained strength from the Covid-19 Pandemic.

However, the self-service health system, because it is a new technology and still little studied, generates doubt and fear for hospital management about the benefits of the systems available in the market, thinking about the satisfaction and experience of patients who will use these services.

This mapping reinforces the initial assumption of the existence of few publications related to self-service technologies focused on the health area. There was a large volume of articles in the studied databases directed to self-service technologies in the banking sector and in the commercial sector. The studies studied showed good results and good proposals for the area, as well as good receptivity on the part of users, and especially showed that there is still much to do to make self-care in the health area a more accessible and facilitated reality in the daily life of the population.

The main limitation of this study is the result of the interpretation of the authors in the analysis of the articles, which may have impaired the inclusion of relevant papers. This bias was sought by conducting this bias separately from the mapping by two researchers and the evaluation of the analysis performed by the other two researchers. The terms used in *the* search strings may also have affected the amount of articles returned, so important primary articles may not have been analyzed. However, this risk was mitigated through double verification through peer verification.

Regarding the temporal evolution, the prevalence of publications in the Web of Science database was notorious, especially in 2020, which may be associated with the breadth of journals and newspapers indexed in the database and accessibility in obtaining data for the development of studies over the years. With the Covid-19 pandemic, there was an intense need to develop technological resources to ensure the communication of organizations with their users, so a greater number of publications were expected between 2020 and 2021. Technological advances were also responsible for defining the origin of the self-service, with a predominance of mobile applications and websites. Adherence to these technologies is due to the feasibility of development, cost reduction by organizations and good acceptance of users. Patients in general predominated in access to self-service services, which can be justified by the search for resources that organizations make available, such as access to consultations - teleconsultations - appointments,

payments, registration changes and other relevant information/resources. However, some items made the experience displeasure, such as difficulty increasing it to platforms, confusing platforms and features that did not meet users' objectives. Therefore, the importance of studies of analysis of services before the implementation stages is emphasized.

It is suggested, as future studies, research that addresses recent technologies and the measured cost-benefit relationship in their application, since the use of technologies developed for self-service enables non-face-to-face communication, thus, the costs and benefits when compared to face-to-face communication differ swells in several aspects.

Finally, the results of this study reinforce the need for future *research that identifies gaps for* the implementation of self-service technologies in the health area and solutions in the aspects of information security and access facilities.

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