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Research Paper

Plain Language in Interactive Systems: A Systematic Mapping of Domains, Practices, and Challenges

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Abstract. *Context*: Plain Language is a multidisciplinary technique and civic movement that aims to make it easier for users to find, understand, and use information, whether in documents, digital interfaces, or data visualizations. Its adoption has expanded in areas such as Government, Health, and Law, driven by legislation and public policies. In Computing, specifically in the area of Human-Computer Interaction, this technique presents itself as an important quality attribute in systems for inclusion, transparency, and digital accessibility. *Objective*: This study investigates how Plain Language has been applied in the design of interactive systems in HCI, identifying domains, objectives, methods, challenges, and other aspects reported in the literature. *Method*: We conducted a systematic mapping study following a rigorous protocol, encompassing data search, filtering, and extraction. We also followed a qualitative approach based on thematic analysis for coding and synthesizing the 18 selected studies. *Results*: The results reveal a predominance of studies in the health domain and a strong focus on comprehensibility, mainly applied during evaluation stages. Limited use of Plain Language was observed in early design phases and challenges in scalability and limited automation, insufficient user-centered and qualitative evaluations, and limited consideration of cultural factors. *Conclusion*: The results indicate that Plain Language is still applied in a limited way in HCI, pointing to opportunities for deeper theoretical integration, broader design support, and more robust methods for inclusive and efficient interactive systems.

Keywords: Plain Language, Interactive Systems, Systematic Literature Review, Research Challenges

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1 Introduction

Plain Language (PL) is simultaneously a technique and an international civic movement that seeks to produce communication that is so clear that its intended audience can easily find what they need, understand what they find, and use the information provided [IPL, 2026]. To achieve this goal, PL offers guidelines and practices that orient language use across writing, information structure, and design. PL is grounded in a multidisciplinary approach, drawing on fields such as Linguistics, Cognitive Psychology, and Information Architecture, among others. More recently, its application has expanded beyond written language to also encompass visual and imagery-based dimensions of communication [Schriver, 2017].

From a Computing perspective, PL has been increasingly integrated into areas with a strong emphasis on people-centered communication, such as Human-Computer Interaction (HCI) [da Cunha Silva *et al*., 2024], [Nunes *et al*., 2023], Information Systems [Carvalho *et al*., 2022], Data Visualization [Oliveira *et al*., 2023], among others. In HCI, in particular, PL has been adopted as a criterion of quality in use, especially in systems that require clarity, accessibility, and comprehensibility for audiences with low literacy in the subject. An example is digital government systems, in which PL acts as a counterbalance to technical language, fostering inclusion and equitable access to information [Fischer *et al*., 2019; Nunes *et al*., 2023; Silveira *et al*., 2024].

In Brazil, the adoption of PL gained momentum through legislation that recommended its use, such as the Access to Information Law [Brasil, 2011] and the Digital Government Law [Brasil, 2021], reinforcing the strategic role of PL in transparency and citizenship [Cappelli *et al*., 2023]. In 2025, a national policy on the topic was approved [Brasil, 2025], representing a civilizational milestone and a starting point for the consolidation of this practice within the Brazilian State. Moreover, with strong support from the Brazilian community, ISO standards related to PL have been published [ISO, 2025], including translations adopted by ABNT [2024], aimed at supporting and structuring PL guidelines in the national context.

Despite these advances, there is still a lack of studies that systematically investigate how and to what extent PL has already been, or could be, incorporated into the design of interactive systems. Some reviews on this topic focus only on the simplified textual language promoted by the technique [Stoll *et al*., 2022], others examine its relevance primarily from an organizational perspective [Giacomin *et al*., 2024; Coutinho *et al*., 2025], while others revisit the topic from the standpoint of a single domain, such as healthcare [Grene *et al*., 2017]. Although these studies contribute important insights, they offer a limited understanding of PL as a design-oriented practice in interactive systems. Recent studies have also highlighted the potential of integrating PL into Human-Computer Interaction (HCI) and User Experience (UX) practices in the design of interactive systems [da Cruz Pereira and Darin, 2024; Oliveira and Cappelli, 2024]. The PL perspective can be a relevant factor in addressing the communicative complexity of interactive systems, which operate through multiple dimensions of lan-

guage, including verbal, visual, iconographic, and structural aspects. However, there is still no comprehensive understanding of how PL has been adopted in HCI research. Consequently, there is a need for a systematic examination of how language and non-linguistic elements are jointly addressed through PL principles becomes necessary, particularly when the goal is to create inclusive digital experiences [Rossetti *et al*., 2020; August *et al*., 2024].

The Brazilian HCI community, through its grand research challenges, draws attention to plurality as a means of mitigating the development of technologies that may reproduce exclusionary values or perpetuate inequalities affecting historically marginalized groups [de Oliveira *et al*., 2024]. Within this context, PL is recognized as having a relevant role, and the community indicates that it is attentive to future developments of the technique for the benefit of the academic field [de Oliveira *et al*., 2024].

This study also aligns with one of the grand challenges for Computing in the decade 2025–2035 proposed by the Brazilian Computer Society (SBC), which emphasizes the construction of ethical, inclusive, interdisciplinary, and sustainable computational systems to promote participation and social equity [de Medeiros Santos and Wagner, 2025, p.32]. PL can also contribute to this challenge by acting as a tool for reducing inequalities, since it directly supports citizens' ability to understand and interact with digital systems [Martins *et al*., 2023; Cappelli *et al*., 2023]. Furthermore, this challenge highlights digital literacy as a key condition for active participation in society through technology. By fostering the adoption of PL in systems design, this objective contributes to serving as a mechanism to support understanding and transparency for vulnerable populations (e.g., literacy-related or socioeconomic).

From these relationships emerge key aspects that guide the mapping conducted in this study, which is driven by the following high-level research question: **How are Plain Language practices addressed in the design of interactive systems within the field of Human-Computer Interaction?** This study is a complete and extended version of previous work [Oliveira *et al*., 2025] and aims, through a Systematic Mapping Literature (SML) [Kitchenham, 2004; Petersen *et al*., 2008], to present the most common contexts in which these themes intersect and to provide a holistic view of the barriers faced when integrating PL principles into interactive systems.

Following this introduction, Section 2 presents the theoretical background of the research and related work. Section 3 formalizes the methodology, including the research questions, selection criteria, etc. In Section 4, we present the results generated from the selected studies in alignment with the objectives of the article, which constitute the main contribution of this research. Finally, Section 7 presents the conclusions and directions for future work.

2 Background and Related Work

In this section, we present the core concepts that underpin this research. First, we discuss Plain Language (PL). Next, we provide a brief overview of interactive systems design, a central topic in HCI, and examine its potential connections with the former concept. Finally, we introduce the related work in the next section.

2.1 Plain Language

Plain Language (PL) originated in a movement that emerged in the 1940s, driven by the growing concern of researchers, intellectuals, and writers from different fields regarding ornate, obscure, and bureaucratic language [Schriver, 2017]. From the 1970s onward, the foundations that support the technique were established and gained strength in English-speaking countries, such as the United States and the United Kingdom [PLAIN, 2026]. In the early 2000s, the definition of Plain Language was consolidated through a multiyear process led by the International Plain Language Federation (IPLF) [IPL, 2026]. As presented in the introduction of this article, PL is guided by the following principles: (1) the target audience gets what they need (relevant); (2) can easily find what they need (findable); (3) can easily understand what they find (understandable); and (4) can easily use the information (usable) [ABNT, 2024].

The IPLF states that studies of PL have sometimes emphasized writing-related aspects, such as practices focused on words or sentences. However, the recently published first part of the ISO standard, also disseminated by ABNT [2024], reinforces that only 7% of PL practices focus on word choice. PL, in its entirety, encompasses a wide range of issues, including content structure, findability, comprehension, and usability. Overall, PL focuses on guiding effective combinations of writing, structure, and information design to support clearer communication, grounded in the four fundamental principles outlined in its definition.

At this point, it is important to clarify the meaning of the term "design" as used in the definitions of PL and HCI. It is widely acknowledged that the term is multifaceted. Nevertheless in its modern sense, it refers to the act of designing or planning something [Martins, 2014]. That is, design is understood as a multi-stage process aimed at the realization of a solution, with variations depending on the object of focus in each field. In HCI, this process relates to interaction, understood as the design of interactive products to support how people communicate and interact in their everyday lives [Rogers *et al*., 2013]. In contrast, within the definition of PL, the focus lies on information design. This is also a process of analysis, planning, and problem-solving, but one that is oriented toward message comprehension, using content, language, and form to achieve clarity in communication [Pettersson, 2010]. In this sense, the notion of design advocated by PL is more closely aligned with fields such as graphic design and visual communication [Sanches *et al*., 2022].

To facilitate understanding, the term "design" will only be used in compound forms to denote specific concepts, such as "information design," "design thinking," or "interactive systems design." We also adopt the term "project" to refer to the activities involved throughout the entire life-cycle of ideation, development, and evaluation of interactive technologies. Definitions related to graphic design and user interface components, such as colors, typography, or images, will be referred to as visual elements.

2.2 Interactive Systems Design

Human-Computer Interaction (HCI) is a field of study that investigates the project, implementation, and evaluation of interactive computer systems for human use, together with the phenomena related to such use [Hewett *et al*., 1992]. The design of an interactive system is an iterative process of analysis, synthesis, and evaluation aimed not only at system construction, but also at promoting a positive user experience [Rogers *et al*., 2013].

There are multiple relationships between the principles and foundations of Plain Language (PL) and well-established theories and approaches in HCI, many of which share common principles and objectives. Digital accessibility is one such example [Kulkarni, 2019], in which PL can act as a facilitator of system understanding and use, aligning with accessibility and usability guidelines [Moreno *et al*., 2019; da Cunha Silva *et al*., 2024]. In the WCAG[1], one of the most widely adopted web accessibility guidelines, PL-related practices are similar to and, in some cases, overlap with those associated with the "understandable" principle. Historically, PL has not aimed to meet the specific needs of people with disabilities, focusing primarily on people with low literacy and their need to access and comprehend information that is vital for participation in society Schriver [2017]. Despite this, accessibility and PL are now considered distinct but mutually overlapping and complementary fields [IPL, 2026; Moreno *et al*., 2019].

Another HCI theory that provides a basis for alignment with PL principles is Semiotic Engineering. This theory is grounded in the idea that a system interface is not merely a functional medium, but a channel of metacommunication between the system designer or developer and the user [de Souza, 2005]. That is, when interacting with a system, users are effectively interpreting a message left by the designer about how the system works, its goals, and how it should be used [Prates and Barbosa, 2007]. Both approaches place comprehension at the center of the interactive communication process. While Semiotic Engineering is concerned with ensuring that the "designer's message" is conveyed clearly and effectively, PL provides linguistic, structural, and visual strategies to ensure that communication is not only functional but also inclusive. In this sense, HCI theory offers conceptual space for PL to be used as a tool to enhance system communicability. Moreover, methods from Semiotic Engineering are compatible with and have already been applied in combination with PL practices to improve interactive systems [da Cunha Silva *et al*., 2024].

2.3 Related Works

In the study by da Cunha Silva *et al*. [2024], the authors demonstrate how the use of Plain Language (PL) can enhance interaction with automatic translation systems, particularly avatar-based interfaces designed to support communication for deaf users. The study illustrates how PL can be integrated into different stages of interactive system development to promote greater accessibility for populations with specific communication needs. However, it also highlights the need to develop PL guidelines that are specifically adapted to the particularities of communication in Brazilian Sign Language (Libras), as well as to ensure the continuous integration of these practices throughout such systems.

In a different vein, the study by Oliveira *et al*. [2024] integrates PL as a quality criterion at the evaluation stage of interactive systems. The authors combine the Semiotic Inspection Method (SIM) with analyses of PL practices derived from a public service guideline to evaluate a public health application in terms of comprehension and usability. The study indicates that this methodological combination can be advantageous not only for identifying inconsistencies associated with specific language practices but also for guiding alternative design solutions, for example, improvements in the wording of metalinguistic signs, the addition of shortcuts, and the inclusion of supporting resources [Oliveira *et al*., 2024]. Despite these advantages, the proposed methodology remains context-specific and requires further refinement and validation.

The work by Nunes *et al*. [2023] also addresses the evaluation stage. At the same time rather than focusing on a specific interactive system, it aims to guide the application of PL in public service portals. This approach, together with other studies such as Moreno *et al*. [2019], tends to prioritize textual content or the structure of written information in interfaces, without sufficiently examining the role of visual language, interactive organization, or visual elements in the construction of comprehensible interfaces.

Other studies, such as those by Oliveira *et al*. [2023] or Carvalho *et al*. [2022], are more propositional in nature and highlight the relevance of the intersection between PL and HCI, but do not explicitly address interactive systems design. From the perspective of existing literature reviews on the topic, there are studies on PL in other domains, such as law, that help map the relevance of the theme [Giacomin *et al*., 2024], but that do not include its application to interactive systems [Stoll *et al*., 2022]. These limitations reinforce the need for systematic studies that provide a broader account of how PL foundations can be integrated into the HCI development process.

3 Methodology

To ensure the rigor of our literature review, the procedures were conducted based on the guidelines proposed by Kitchenham [2004], following three main phases:

1. **Planning**, which involved defining the objectives, selection criteria, choosing the database, and formulating the search strategy;
2. **Conducting**, which consisted of carrying out the planned procedures, including searching for articles, screening studies based on predefined criteria, and extracting and analyzing data;
3. **Reporting**, which includes the presentation of the overall results and the answers to the research questions.

It is important to note that, following the selection of studies during the conducting stage, we additionally adopted a thematic analysis approach [Braun and Clarke, 2006, 2019] to examine the full content of each article and to provide in-depth answers to the qualitative research questions of the study, such as the challenges and objectives associated with PL in the HCI literature (Section 3.1.1). This complementary

[1] https://www.w3.org/WAI/standards-guidelines/wcag/ - Last accessed on 15 September 2026

analytical strategy was necessary to capture nuances that go beyond descriptive data extracted during earlier stages of the review. Thematic analysis is a flexible approach for analyzing qualitative data [Martinelli *et al*., 2023], based on the systematic coding of the entire dataset and the generation of themes derived from meaningful units identified across codes [Braun and Clarke, 2019].

We organized all methodological stages, labeled from A to E, as illustrated in Figure 1. In Stage A (Search), we identified an initial set of studies returned through the execution of the search string across the databases defined in the study. Subsequently, in Stage B (Screening), a series of filtering procedures, such as duplicate removal and exclusion based on titles, abstracts, and keywords, were applied to retain only studies relevant to the scope of the review. In Stage C (Extracting), we extracted structured information from the selected articles to address more objective research questions, such as the domain and the target audience. Next, in Stage D (Coding), we conducted a full rereading of the selected studies and performed an inductive coding, without predefined codes, across all relevant excerpts. Finally, in Stage E (Definition of the themes), we iteratively refined and grouped the codes to generate themes that represent our findings, which are presented in Section 4. Stages A and B were executed and reviewed with the support of the online software Parsifal[2], whereas Stages C through E were transcribed and analyzed using the qualitative analysis software MAXQDA[3].

Four researchers were involved across the different stages from A to E, referred to as P1 through P4. It is important to note that all researchers have a background in Computer Science, with P2 and P4 working specifically in the field of HCI, while P1 and P4 have more than ten years of expertise in PL. Throughout the execution of the study, the researchers maintained an open communication channel, aligning expectations for each stage and the way to conduct the analyses. The review protocol was collaboratively designed and refined by all researchers (P1–P4) throughout 2024. Beginning in April 2025, the study selection, data extraction, and coding stages were conducted over approximately four months, led by P1 and reviewed by P2 and P4. The thematic synthesis and the formulation of answers to the research questions were then carried out over the following two months through successive discussions and consensus meetings involving P1, P2, and P4. The entire process was documented, with research data available in the "Availability of Data and Materials" section at the end of the article. The following sections describe each methodological stage in detail.

3.1 Phase 1 - Planning

3.1.1 Research Questions

The research questions highlight the main topics of interest related to Plain Language (PL) practices in the field of HCI (Human-Computer Interaction). They were designed to provide a comprehensive mapping that encompasses multiple analytical dimensions, from contextual aspects (domain, objectives, and target audience) to characteristics related to the scope of PL application (sources of practices, artifacts in which they were applied, and evaluation methods), as well as the main challenges reported in the literature.

3.1.2 Search String

This study was guided by the PICO methodology of Kitchenham [2004], which supports the identification of a set of keywords that represent the expected scope of the research outcomes. In this study, the Population corresponds to the area of interest, defined as *"Human-Computer Interaction"*, including related synonyms such as *"Interactive Systems"* and representative terms of the field, such as *"Usability"* and *"Accessibility"*. The Intervention refers to the procedure used to address the specific research question, and therefore includes terms related to *"Plain Language"* and its synonyms, such as *"Citizen Language"*.

In this research, we did not employ additional sets of terms commonly included in PICO-based structures, such as outcomes or comparison, as the study does not involve a comparative design, and to avoid restricting the search space through specific terms. Several pilot tests were conducted to verify whether the search string retrieved relevant studies, such as Nunes *et al*. [2023]. The search string was intentionally defined only in English and was not translated into Portuguese, since the selected databases, including those indexing Brazilian publications, use English metadata (e.g., titles, abstracts, and keywords). Consequently, studies published in Portuguese could also be retrieved through the same search strategy. The inclusion of negative terms (NOT) was necessary to exclude studies containing variations of the term "Plain Language Summary", which typically refers to health-related research that provides simplified textual summaries for lay audiences and is not aligned with the focus of this review [Stoll *et al*., 2022].

The final search string defined for the review protocol was as follows: *(("Human-Computer Interaction" OR "Accessibility" OR "Computer-Human Interaction" OR "Interaction Design" OR "Interactive Systems" OR "Usability" OR "User Experience" OR "User interface" OR "User-Centered Design") AND ("Plain Language" OR "Citizen Language" OR "Clear Language" OR "Plain English" OR "Plain Language Movement") AND NOT ("Plain Language Summary" OR "Plain English Summary")).*

3.1.3 Research Databases

The databases selected for study retrieval were Scopus [4], ACM Digital Library [5], IEEE Xplore [6], Web of Science [7], and the SBC Open Library (SOL)[8]. All are well-established digital libraries widely recognized by the computer science research community. The search string was maintained in its entirety and adapted to the syntax of each database, retrieving studies based on metadata fields such as titles, abstracts, and/or keywords. An exception was made for the SOL database, where a shortened version of the search string was used due to the

[2]https://parsif.al/ - Last accessed on 15 September 2026

[3]https://www.maxqda.com/ - Last accessed on 15 September 2026

[4]https://www.scopus.com/pages/home - Last accessed on 15 September 2026

[5]https://dl.acm.org/ - Last accessed on 15 September 2026

[6]https://ieeexplore.ieee.org/Xplore/home.jsp - Last accessed on 15 September 2026

[7]https://clarivate.com/academia-government/scientific-and-academic-research/research-discovery-and-referencing/web-of-science/ - Last accessed on 15 September 2026

[8]https://sol.sbc.org.br/index.php/indice - Last accessed on 15 September 2026

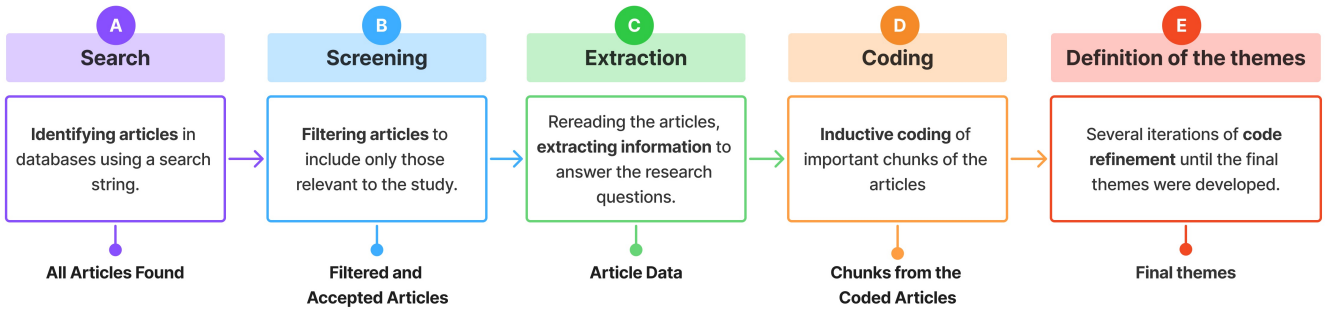

Figure 1. Steps in the Methodology used in the Literature Review.

Table 1. Research questions and their motivations

Topic	Question	Motivation
Context	RQ 1.1. What are the most frequent **domains**?	This question aims to map the sectors in which Plain Language is applied, helping to reveal trends and less explored areas (e.g., government, education).
	RQ 1.2. What are the **objectives** for using PL?	This question allows the identification of the motivations behind the adoption of Plain Language (e.g., improving comprehension, promoting accessibility).
	RQ 1.3. What **target audience** profiles are involved?	This question seeks to characterize the users for whom systems adopting PL are designed, including aspects such as literacy levels or specific needs.
Scope	RQ 2.1. What are the **sources** of the PL practices used?	This question aims to identify the origins of the PL practices adopted (e.g., official guidelines, institutional recommendations).
	RQ 2.2. In which **system components** or areas are PL practices applied?	This question makes it possible to map where PL is applied and to reveal the scope of its adoption (e.g., textual content, visual components, interaction models).
Project	RQ 2.3. What **methods** are used to evaluate PL or the systems that adopt it?	This question seeks to identify the evaluation methods applied to PL practices or to interactive systems that incorporate them. The goal is to understand how the effectiveness of PL has been investigated (e.g., user testing, readability formulas).
	RQ 2.4. At which **stages** of the interactive systems design is PL applied?	This question aims to map when PL practices are introduced within the lifecycle of interactive systems projects (e.g., ideation, development, evaluation).
Challenges	RQ 3. What **challenges** or limitations exist in the use of PL?	This question aims to map technical or conceptual barriers that hinder the adoption of PL in interactive systems design projects.

query length limit of its advanced search interface. Terms related to PL were reduced to "Plain Language" and "Citizen Language", and the exclusion terms defined by the NOT operator were removed. This adaptation was necessary to comply with the database's technical constraints while preserving the overall search strategy as much as possible.

3.1.4 *Criteria*

With the aim of selecting studies that aligned with the objectives of this research, the articles retrieved by the search string were filtered through the application of the following inclusion criteria (IC):

- IC1. Studies that effectively address the use of Plain Language, rather than merely suggesting or acknowledging its benefits, in at least one stage of the interactive systems design (such as ideation, development, or evaluation).
- IC2. Articles published within the last 15 years (2010 to 2025). This timeframe ensures the inclusion of current studies while still providing a comprehensive overview of the field.
- IC3. Articles written in English or Portuguese. The latter was included to avoid excluding studies from the Brazilian scientific community, which has made significant contributions to the field.

The exclusion criteria (EC) were as follows:

- EC1. Studies focused on interactive systems related to Plain Language, but which do not directly apply it to the system, such as text simplification tools or automatic validation approaches.
- EC2. Articles addressing Plain Language in non-interactive or non-digital artifacts, such as documents, videos, institutional materials, or similar media.
- EC3. Studies that do not provide sufficient information to answer the research questions, such as the origin or rationale of the Plain Language practices, or the objectives for their application. This category also includes secondary studies (e.g., meta-analyses, surveys, or literature reviews).
- EC4. Articles for which the full-text version could not be accessed.
- EC5. Duplicate studies (articles with the same DOI or different versions of the same work, in which case the most complete version was retained).

3.2 Phase 2 - Conducting

3.2.1 A and B - Search and Screening Stage

In total, 451 articles were retrieved from the selected databases. The first filtering step involved the automated removal of duplicate records using the Parsifal tool, resulting in a dataset of 319 articles. Subsequently, a second screening was conducted through the reading of titles, abstracts, and keywords, during which the inclusion and exclusion criteria were systematically applied. At the end of this stage, 103 articles remained.

A third screening step consisted of a full-text review of these studies, allowing for a more rigorous application of the selection criteria across the entire manuscript. During this phase, articles that did not provide sufficient information to answer the research questions (EC3) were excluded, resulting in a final corpus of 18 studies, which are presented in Table 2. Figure 2 illustrates the complete screening process, including the quantitative results of each stage.

The search protocol, selection criteria, and search strings were developed with the support of the Parsifal tool and validated collaboratively by the researchers involved (P1 to P4). The study selection was conducted by P1 and subsequently reviewed by the other authors, with any disagreements discussed and resolved by consensus during alignment meetings.

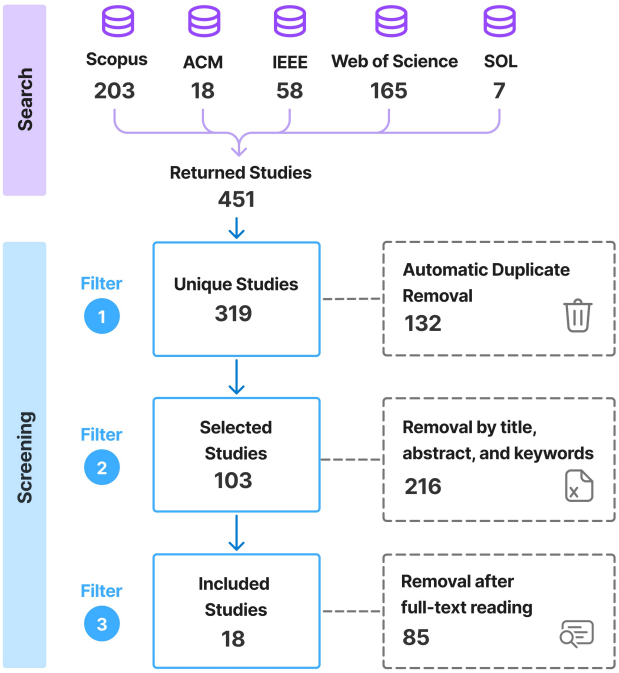

Figure 2. Article search and screening process.

3.2.2 C - Data Extraction Stage

This stage begins with P1 conducting a full reading of all 18 articles selected in the previous phase. This moment represents not only the data extraction process but also the systematic familiarization with the corpus, constituting the initial activity of the thematic analysis [Braun and Clarke, 2006, 2019].

Initially, this stage was supported by a data extraction form [Kitchenham, 2004], which included fields corresponding to the research questions as well as relevant bibliographic information (title, authors, year, and venue of publication). Nevertheless after the first complete reading of the articles, it became evident that not all studies presented information about Plain Language (PL) practices clearly and explicitly throughout the text. This occurs mainly because PL is not the primary focus of many of the analyzed works, but rather a tool or conceptual basis applied in one or more stages of the study, while the interactive system itself remains the central focus. As a result, statements related to future research directions or limitations of PL practices were often dispersed across different sections of the articles and required a more in-depth and interpretive analysis to be identified.

Given this scenario, multiple rereadings were conducted across the corpus to identify, code, and relate chunks that addressed the research questions. The MAXQDA software was used to support the extraction of information through an internal spreadsheet that captured answers to more objective questions, such as domain (e.g., Health, Government) and target audience (e.g., General public, Students, Patients). Other excerpts were coded inductively using the same software, as detailed in the following section. Figure 3 illustrates the main activities of Stage C (Extraction) and Stage D (Coding).

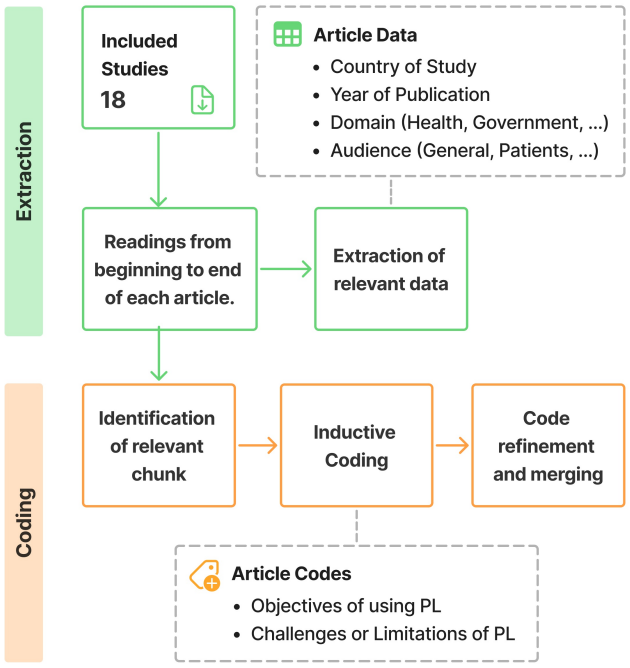

Figure 3. Extraction and coding process.

3.2.3 D - Coding Stage

As mentioned in the previous section, the coding stage was conducted in parallel with data extraction. Researcher P1 performed iterative rereadings of the articles, reviewing previously extracted statements and identifying new relevant chunks to address the research questions. Inductive coding was applied to each newly identified chunk [Souza, 2019; Martinelli *et al.*, 2023]. The codes were assigned names that captured the meaning of the text portions to which they referred, without relying on predefined concepts or categories. Figure 4 presents an example, using excerpts from the study by Nunes *et al.* [2023], illustrating how coding and extraction were conducted in practice.

Based on the full texts of the articles, whenever a relevant chunk was identified, researcher P1 highlighted it and assigned a code derived directly from the content of the chunk itself. In some cases, the chunk directly answered a specific research question, and the corresponding information was therefore extracted and added to the article's data extraction spreadsheet. In Figure 4, the information highlighted with green lines, for instance, already indicates the domain and target audience of the analyzed article. Although visually distinguished from codes in the figure, in practice, these excerpts were also coded to facilitate retrieval and traceability within the MAXQDA software. The codes were frequently revisited by P1 and progressively grouped as similar information emerged across articles. The organization, tracking, and retrieval of codes and chunks to support subsequent alignment meetings and consensus-building with the other researchers were fully managed using MAXQDA. As a result, more than 280 chunks and 60 codes were identified across the 18 analyzed articles.

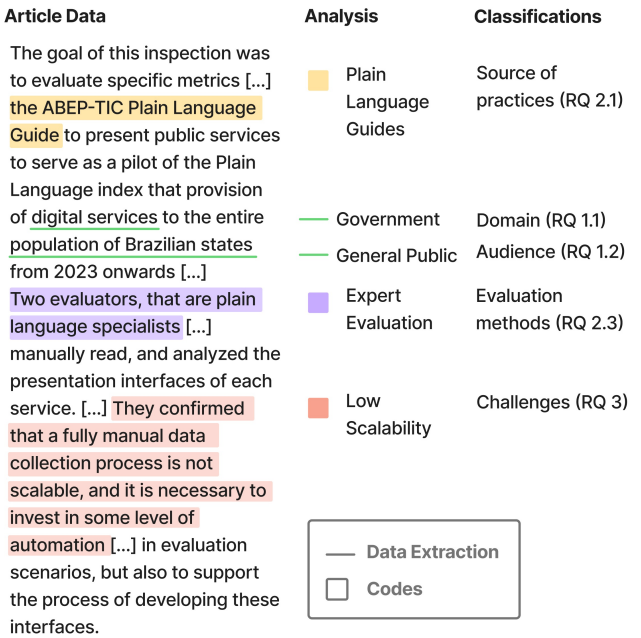

Figure 4. Example of extraction and coding in an article chunk.

3.2.4 E - Theme Definition Stage

After the completion of the coding process across all selected articles, several iterative cycles of reading and refinement of the codes were conducted until themes were defined to address research questions that could not be directly answered through the data extraction reported in previous sections. Themes group codes under a higher-order abstract concept that captures something meaningful in the data in relation to the research question [Braun and Clarke, 2006]. Figure 5 illustrates the activities carried out during this stage.

Researcher P1 reviewed all codes and their associated chunks, seeking to merge conceptually similar codes. For example, the codes "Limited readability metrics" and "Low AI automation for PL" were merged into a single code labeled "Limited automation". In addition, codes that conveyed related meanings or addressed a shared idea were grouped into higher-level codes, which served as candidates for a theme. For example, the codes "Limited automation", "Low scalability", "Need for support", among others, were grouped under the higher-level code "Process," which was later selected as one of the themes addressing PL-related challenges.

To ensure methodological rigor in theme definition, consensus meetings were held with the other researchers (P2–P4) to align on the identified themes and their associated codes. During these meetings, initial themes and their definitions were presented, discussed, and iteratively refined until full consensus was reached. The theme definition process was concluded in this stage.

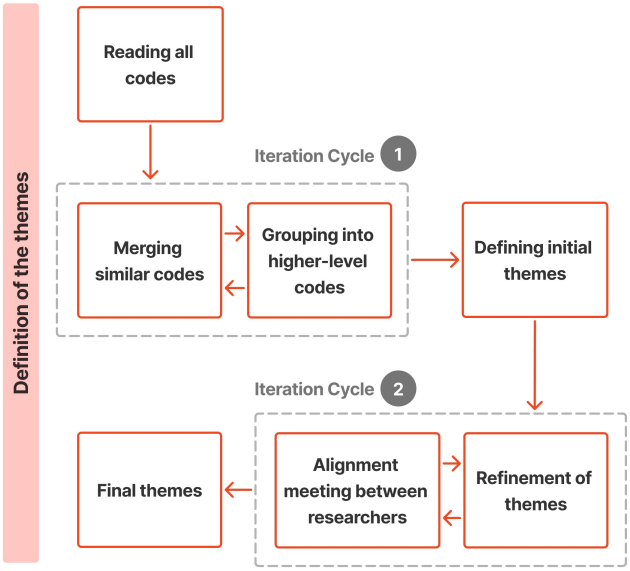

Figure 5. Theme Definition Process.

3.3 Phase 3 - Reporting

In this section, we present descriptive data from the selected articles, together with general analyses, such as their temporal distribution and the countries involved in the studies. Table 2 lists the 18 articles included in this review. Throughout the paper, these studies are referenced using identifiers to reduce the space required for citations in tables and figures.

Figure 6 shows the temporal distribution of the selected articles by publication year. From 2017 onward, at most two articles per year met the objectives of this review. In earlier years, no relevant studies were identified in some periods, such as 2015, 2012, and 2011. Given the highly specific scope of this review, focused on the use of PL in interactive systems, these results do not represent the PL literature as a whole. Nevertheless, they indicate a sustained, albeit limited, presence of PL-related research within HCI over time, with a slight increase in publications starting in 2018.

Figure 7 illustrates the countries represented in the studies included in this review. The results reveal a strong predominance of North American literature, with 13 of the 18 articles authored by researchers from the United States. Other English-speaking countries also appear, such as Canada (2 articles) and the United Kingdom (1 article). This distribution is likely related to the emergence and consolidation of the PL movement in these regions [Adler, 2012; Schriver, 2017].

Table 2. Collection of selected articles.

ID	Refererence
A01	Parmar *et al*. [2025]
A02	Marx and Miller [2024]
A03	da Cunha Silva *et al*. [2024]
A04	Nunes *et al*. [2023]
A05	Backowski *et al*. [2022]
A06	Bona *et al*. [2022]
A07	Maybury *et al*. [2021]
A08	Rughani *et al*. [2021]
A09	Gibson *et al*. [2020]
A10	Langford *et al*. [2020]
A11	Vollenwyder *et al*. [2018]
A12	Paige *et al*. [2018]
A13	Ginossar *et al*. [2017]
A14	Skaggs [2017]
A15	Harley *et al*. [2016]
A16	Summers *et al*. [2014]
A17	Janiak *et al*. [2013]
A18	Dorfman *et al*. [2010]

Despite this concentration, the Global South is represented by two studies conducted in Brazil. The country has promoted PL as a fundamental governmental agenda since the 2010s [PLAIN, 2026]. Latin America also includes relevant contributions to the area, such as Colombia and Argentina. Despite this their publications either do not focus on the development of interactive systems or are limited to publication in local databases.

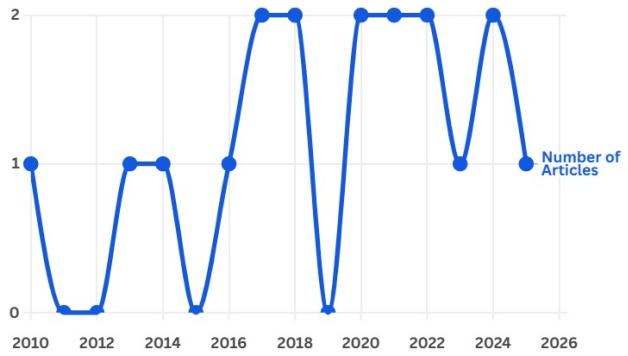

Figure 6. Line graph representing the number of articles per year.

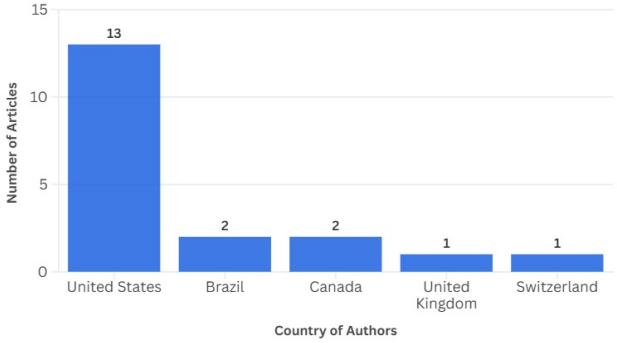

Figure 7. Bar chart showing the number of articles by country of their authors.

Finally, Figure 8 illustrates the distribution of coded chunks used to answer the study's research questions, organized into the following categories: objectives for the use of PL, target audience, sources of PL practices, evaluation methods, system components where PL was applied, and challenges. The research question related to the domain was addressed through contextual information obtained during the data extraction phase (Section 3.2.2). Therefore, it is not represented as a coded category in this figure.

For each article, represented by a bar, the figure shows the number of coded chunks associated with each category. These chunks were assigned inductively to different codes, as explained in Section 3.2.3, to adequately answer each research question, and will be discussed in detail in the Results section (Section 4).

Based on Figure 8, it is possible to observe that the categories with the highest number of coded chunks, such as challenges, objectives, and system components, reflect the presence of multiple factors related to these questions. This suggests that PL is typically associated with more than one objective in the literature, and that different types of system components often receive PL-related interventions within the same study. Importantly, the number of coded chunks does not directly indicate the number of distinct codes addressing a given question; rather, it suggests the relative proportion of evidence associated with each category across the corpus.

In contrast, categories represented by only a single chunk, such as target audience and source of PL practices, are generally addressed more directly and explicitly in the articles. Additionally, Figure 8 makes explicit the contribution of each article to answering the study's research questions, highlighting differences in depth across the selected studies.

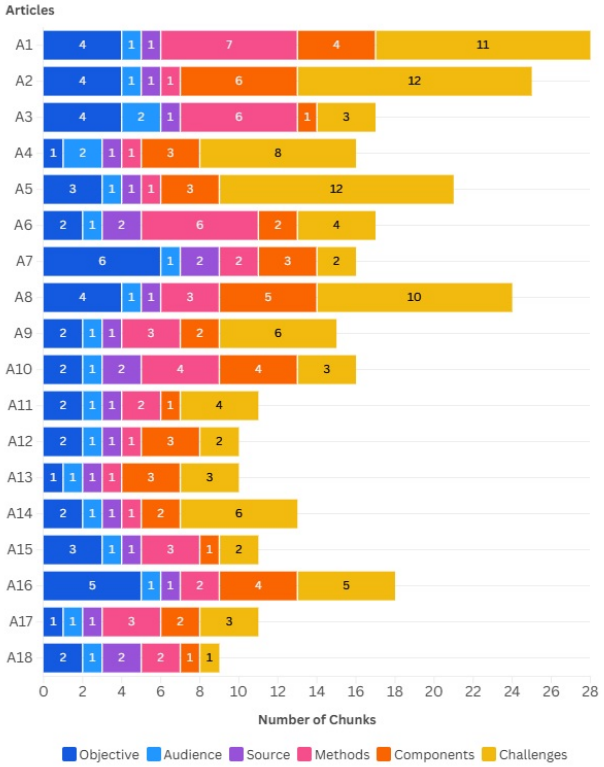

Figure 8. Bar chart showing the number of coded chunks per article.

4 Results

In this section, the results of the research questions are presented. To ensure clarity and coherence, the results are organized following the same topical structure previously introduced in Table 2. First, we address the **Context** (Section 4.1), which includes questions related to domain, objectives, and target audience. Next, the **Scope** (Section 4.2) covers the sources of PL practices and the system components in which PL was applied. In the **Project** topic (Section 4.3), we highlight the methods and design phases associated with the use of PL. Finally, the **Challenges** identified in the literature are presented and discussed in Section 4.4.

4.1 Contexts

Table 3 organizes the main contexts identified in the selected studies, covering the following aspects: (a) **Domain** or application area in which the study is situated; (b) **Objectives**, which summarize the purpose of applying PL in each study; and (c) **Target Audience** profiles, describing the characteristics that define the group addressed by the study.

4.1.1 RQ 1.1. What are the most frequent domains of use for Plain Language?

Healthcare is the predominant application domain for PL in interactive systems design. Among the 18 selected studies, 11 focus on healthcare-related applications, as shown in Figure 9. Because each article is associated with a single domain category, the diagram presents frequencies that sum to the total number of selected studies (n = 18).

It is important to note the diversity of healthcare contexts in which PL is applied, ranging from clinical applications addressing specific conditions, such as cancer or endometriosis, to broader health-related topics, including mental, oral, or sexual health. For example, Langford *et al.* [2020] employs PL in the design of a web-based system to support informed decision-making for cancer patients. While Dorfman *et al.* [2010] developed a decision-support website to assist men over the age of 45 in making informed choices regarding prostate cancer screening. Both studies adopt the criteria of the International Patient Decision Aid Standards (IPDAS), which recommend guidelines closely aligned with PL principles, such as avoiding technical terminology and ensuring that textual content is accessible at a low reading level.

In addition to healthcare, the reviewed studies also address other domains, including government (3 articles), education (2 articles), and accessibility (2 articles). Notably, domains traditionally associated with the use of Plain Language, such as Law, were not identified in this review, likely due to their limited intersection with HCI and the fact that relevant publications are often disseminated through different databases.

4.1.2 RQ 1.2 - What are the objectives for using Plain Language?

The identified studies present a variety of objectives for the use of PL. To support a clearer synthesis, we classified the studies at a higher level of abstraction, representing the primary characteristic targeted through the application of PL, such as comprehension or usability. The resulting themes are presented below:

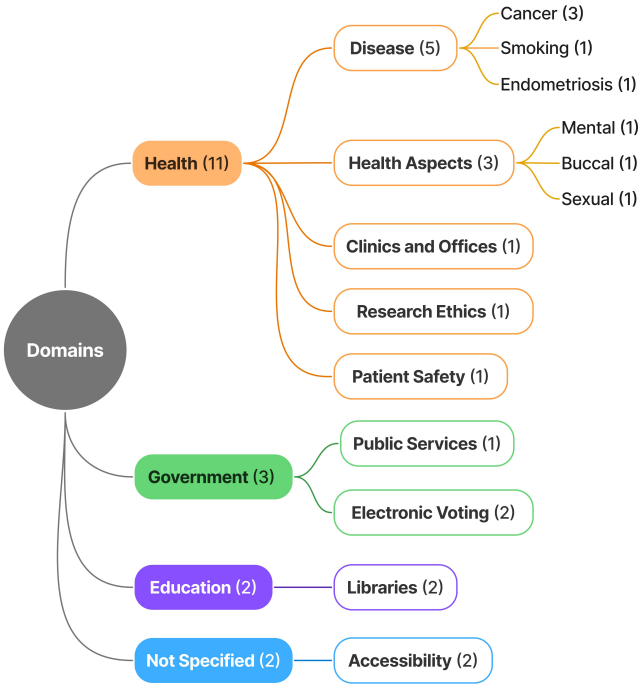

Figure 9. Diagram of the domains found in the articles.

Comprehensibility, a characteristic related to understanding, can be defined as the audience's ability to easily understand the intended information [IPL, 2026]. It is one of the most frequently addressed attributes in PL-related research [Fischer *et al.*, 2019; Cappelli *et al.*, 2023], often motivated by the principle of "facilitating audience understanding" explicitly stated in the definition of PL [IPL, 2026]. In total, 13 studies were directly associated with this theme, either by using PL practices to evaluate comprehension or by applying them to improve this aspect.

Within this group of studies, some associate this objective of facilitating understanding with use-related aspects, such as reducing the likelihood of errors caused by complex information and maintaining informational accuracy [Summers *et al.*, 2014; Parmar *et al.*, 2025]. Others extend this focus by relating comprehensibility to readability, aiming to speed up reading [Backowski *et al.*, 2022; da Cunha Silva *et al.*, 2024], or to the improvement of textual features, such as spacing or typography [Rughani *et al.*, 2021].

Another prominent theme in the studies is **Health Literacy**. It is defined as individuals' ability to access, understand, and use information to promote and maintain good health [Rughani *et al.*, 2021]. This concept is closely related to Plain Language (PL); however, while PL has a broader scope, health literacy specifically focuses on applying these principles within the healthcare context. A total of 9 articles explicitly identified the promotion of health literacy as a central research objective. In the study by Ginossar *et al.* [2017], the authors demonstrate that patients with low health literacy are less likely to use health applications, perceive them as easy or useful, or effectively benefit from the technology. Given the predominance of health-related studies in this review, this focus becomes particularly evident. In general, articles pursuing this objective also aim to improve comprehensibility, but with a specific emphasis on health information. In addition, some studies highlight the use of PL to support patient auton-

Table 3. Context: domain, objectives, and target audience.

Questions	Categories	ID Articles
RQ 1.1. Domains	Health	A01, A02, A06, A07, A08, A09, A10, A12, A13, A17, A18
	Government	A04, A15, A16
	Education	A05, A14
	Accessibility	A03, A11
RQ 1.2. Objectives	Comprehensibility	A1, A2, A3, A4, A5, A8, A9, A10, A11, A12, A14, A15, A16
	Findability	A5, A7, A14
	Communicability	A03
	Health Literacy	A1, A2, A6, A7, A8, A10, A12, A13, A17
	Accessibility	A2, A11, A15, A16, A18
	Usability	A5, A15, A16
RQ 1.3. Target Audience	Patients (in general or specific diseases)	A01, A09, A10, A13
	Academic (students, teachers, librarians, etc..)	A05, A06, A14
	General Public	A02, A04, A07, A11, A12
	Men over 45 years old	A17
	Women between 18 and 26 years old	A18
	Person with disability (deafness, dyslexia, mild cognitive impairment, etc.)	A03, A15, A16
	People with vulnerabilities (economic, low literacy, non-native speakers)	A08, A15, A16

omy in informed decision-making [Paige *et al*., 2018; Parmar *et al*., 2025] and to enhance accessibility in health systems [Marx and Miller, 2024].

Beyond content comprehensibility, **Findability** also emerged as one of the objectives associated with PL in the articles. It is defined as the ease with which specific information can be located, and is a commonly used term to describe navigation in websites or web-based systems [**?**]. Only a small number of studies (3 articles) explicitly focused on this aspect, and in most cases, it was addressed in conjunction with the evaluation of comprehensibility. We believe this focus is partly explained by the PL definition itself, which already frames "finding information easily" as a fundamental criterion. Low findability can lead users to abandon the search, cause dissatisfaction, or even result in seeking information from less reliable sources [Maybury *et al*., 2021]. Despite this, most studies remain primarily centered on understanding rather than navigation-related concerns.

In contrast to these more widely explored objectives, **Communicability** was identified in only one study [da Cunha Silva *et al*., 2024], previously discussed in Section 2.3. This characteristic aims to ensure that users clearly understand the message conveyed by the system designer through the interface. It is grounded in Semiotic Engineering theory, which conceptualizes system analysis and design as a communication process mediated by signs [de Souza, 2005]. In the study by da Cunha Silva *et al*. [2024], communicability is explicitly defined as the ultimate objective of applying PL in one stage of the system design process.

Similarly intersecting with several of the objectives discussed above, **Accessibility** is a field closely related to PL, as discussed in Section 2.3. It aims to remove barriers to technology access for people with limitations or specific needs [Kulkarni, 2019]. As highlighted in Section 4.1, which discusses target audiences, several studies explicitly focus on ensuring access for marginalized or minority groups. In total, 5 articles emphasize accessibility as a complementary objective of PL use. These studies highlight concerns related to equity, inclusion, belonging, and the autonomy of all individuals [Dorfman *et al*., 2010; Marx and Miller, 2024].

Other objectives, such as **Usability**, were also identified, although less frequently (3 articles). This objective typically emerges in connection with accessibility concerns, aiming to broaden the use of technologies by groups with specific difficulties. The studies argue that Plain Language, when aligned with usability goals for accessibility, contributes to improved usability for all users [Harley *et al*., 2016] and should be oriented toward social justice and user empowerment [Backowski *et al*., 2022].

4.1.3 RQ 1.3 - What are the target audience profiles involved?

Figure 10 presents the themes and codes used to identify the target audience profiles involved in the selected studies. Because some articles address more than one audience profile, the diagram reports frequencies that exceed the total number of selected studies. The main audience categories identified are as follows: (a) patients, representing audiences in healthcare-related studies, subdivided into those with specific medical conditions and those without; (b) minorities, a theme that groups studies focusing on people with disabilities, including deaf individuals, people with dyslexia, and individuals with intellectual disabilities.

In addition, this category also encompasses studies involving people with low literacy levels, non-native speakers of the language used in the study (most commonly English), and individuals experiencing socioeconomic vulnerability. Across

these cases, the use of PL is typically justified as a means to support marginalized groups or populations with limited access to resources, reinforcing PL's focus on equitable and comprehensive access to vital information.

(c) academic audiences, related to educational contexts, such as teachers, university students, and librarians; (d) gender-specific audiences, mostly observed in healthcare studies, where certain conditions or health concerns are specific to a particular gender; and (e) general public, referring to articles in which no clearly defined audience profile was identified, and which therefore address broad populations, such as those of the United States, Brazil, or Switzerland.

Overall, the reviewed studies predominantly target well-defined user groups, whether patients in healthcare contexts, populations with or without low literacy, or specific communities shaped by the application context.

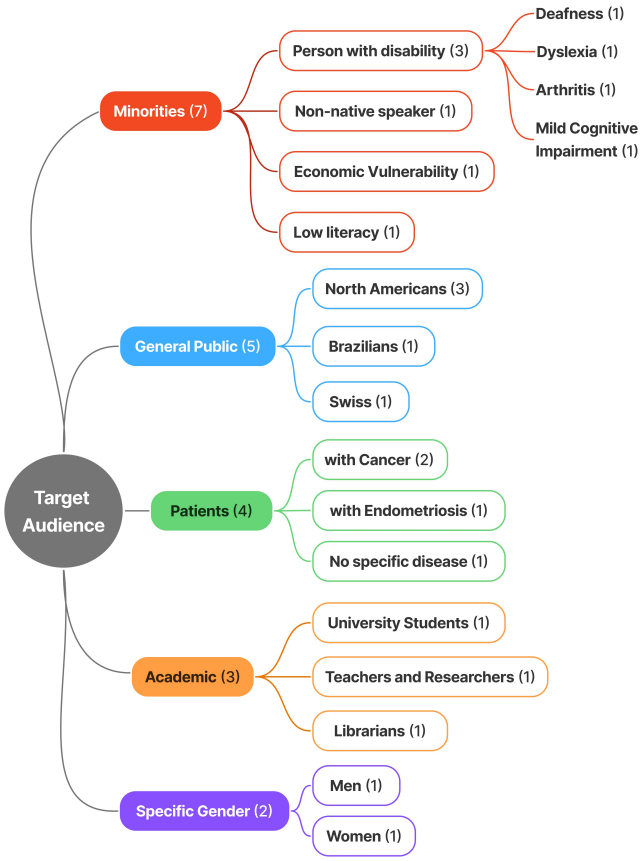

Figure 10. Diagram of the audiences found in the articles.

4.2 Scope

Table 4 provides an overview of how PL practices are applied across the selected studies. The research questions address: (a) the **Sources** from which the PL practices adopted in the studies originate; and (b) the system **Components**, that is, the types of information or system areas (e.g., textual content, visual elements, interaction mechanisms) to which PL practices were applied.

4.2.1 RQ 2.1 - What are the sources of the Plain Language practices used?

The sources or origins of the PL practices used in the selected articles were diverse. One of the main sources identified was the use of guides and their associated guidelines (10 articles). Some studies relied on the original PL practices developed in the United States, particularly the Federal Plain Language Guidelines [Maybury *et al.*, 2021; Backowski *et al.*, 2022; Marx and Miller, 2024]. This guide is among the most widely recommended references for PL adoption.

Other studies followed institutional guidelines, such as those issued by the Brazilian Association of Information and Communication Technology Entities (ABEP-TIC) [Nunes *et al.*, 2023]. Guidelines from U.S. universities and medical institutes were also cited [Ginossar *et al.*, 2017; Paige *et al.*, 2018], as well as recommendations from public agencies, such as the U.S. Election Assistance Commission's Voluntary Voting System Guidelines (VVSG) 2.5, which include usability and Plain Language standards [Summers *et al.*, 2014].

Other practices reported in the articles originated from institutional indices (5 articles), which consist of well-established evaluation tools (e.g., checklists, questionnaires) for assessing comprehensibility, particularly popular in the health domain. These tools are strongly inspired by and grounded in core PL principles, such as the Suitability Assessment of Materials (SAM) [Janiak *et al.*, 2013], the Clear Communication Index (CCI) developed by the U.S. Centers for Disease Control and Prevention (CDC) [Marx and Miller, 2024], and the Health Literacy Environment of Hospitals and Health Centers (HLE2), which is used to identify facilitating factors and barriers to information access [Maybury *et al.*, 2021]. In addition, standards for health and care information from NHS England were adopted, based on the visual interface element system of the UK government website [Braun and Clarke, 2006]. We also identified the IPDAS guidelines [Dorfman *et al.*, 2010; Langford *et al.*, 2020], previously discussed in Section 4.1.

It is noteworthy that many articles also relied on expert-based translation approaches (8 articles). Some studies employed professional translation services [Harley *et al.*, 2016; Vollenwyder *et al.*, 2018], while others involved academic experts [Dorfman *et al.*, 2010; Bona *et al.*, 2022]. These activities included, in some cases, the initial translation of information into Plain Language, the review of PL practices, or even suggestions for improving the organization and presentation of information.

4.2.2 RQ 2.2 - In which system components is Plain Language applied?

To address this research question, we used the types of interactive systems identified as categories to subsequently present the types of components or application areas in which PL was applied, as shown in Figure 11. The systems identified are predominantly web-based systems (5 articles) or websites (8 articles). Mobile applications (apps) also appear as a relevant category (3 articles), followed by less common applications, such as an interactive dashboard and an automatic translator (1 article each).

Based on this mapping, the components that most frequently received intervention, evaluation, or construction through PL practices are textual content. All studies apply PL to improve, assess, or guide the understanding of texts, even when these texts are embedded in multimedia applications, such as videos, or in database-driven systems. This finding

Table 4. Scope: source of LP practices and system components.

Question	Categories	ID Articles
RQ 2.1. Sources	Expert translation	A01, A06, A08, A09, A10, A11, A15, A18
	Guides (Federal PL Guidelines, institutional versions, etc.)	A02, A03, A04, A05, A07, A12, A13, A14, A15, A16
	Indices (checklists, evaluation questionnaires, institutional criteria, etc.)	A07, A08, A10, A17, A18
RQ 2.2. Components	Texts	A01, A02, A03, A04, A05, A06, A07, A08, A09, A10, A11, A12, A13, A14, A15, A16, A17, A18
	Hierarchy and Organization	A01, A04, A05, A08, A10, A14
	Layout	A02, A10, A16, A17
	Typography	A02, A08, A17
	Color Contrast and Responsiveness	A08
	Navigation	A07, A10
	Visual Resources (Images, Multimedia, etc.)	A02, A08, A10, A17
	Interaction	A09, A12, A13, A16
	Usability	A12, A13

reinforces that the application of PL in interactive systems remains strongly grounded in the original foundations of the technique, which emerged primarily to reduce bureaucratic complexity in legal and administrative texts [Schriver, 2017].

At the same time, PL has gradually expanded beyond textual content, attracting interest from the field to promote comprehensibility and other PL principles from the perspective of interfaces and data visualizations [Oliveira *et al.*, 2023]. Such applications remain relatively recent and lack widely established foundational guidelines, which helps explain the limited number of studies addressing these components.

By contrast a smaller subset of studies has identified the application or evaluation of Plain Language principles in other system components. For example, Rughani *et al.* [2021] explored the readability of websites for medical clinics and practices located in socioeconomically disadvantaged areas. Their analysis also extended to visual elements in the interface, such as color contrast, typography, and image use. The study concludes that all the websites evaluated performed below ideal readability standards, according to expert assessments.

Similarly, in the study by Summers *et al.* [2014], mobile voting ballots were developed for readers with specific needs, such as individuals with low literacy levels or older adults. The authors followed the VVSG 2.5 guidelines, which include usability, Plain Language, and accessibility standards. They concluded that, in addition to Plain Language, a simple interaction design is also required. This concept is defined as an interaction designed to help users clearly understand the information presented, the actions expected of them, and the outcomes of those actions. As a result, the study proposes design guidelines as research contributions, including support for immediate action, linear interaction flows, and maintaining user focus within a constrained attention space, among others.

4.3 Project

Table 5 presents an overview of the project stages in which Plain Language (PL) practices were applied within interactive systems. The research questions addressing this dimension

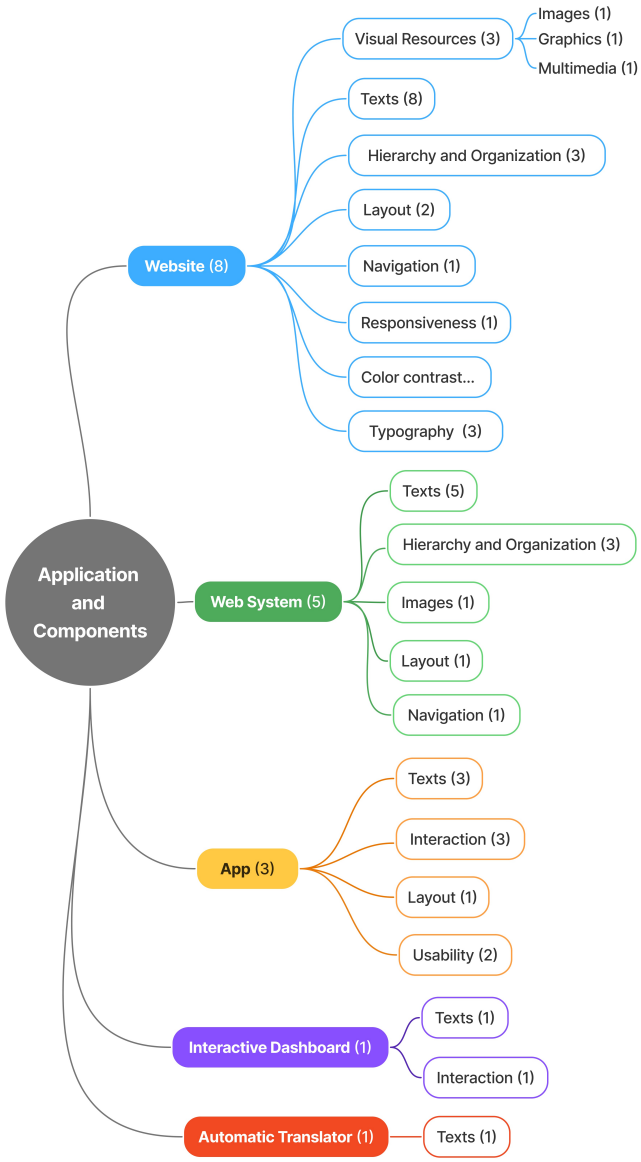

Figure 11. Diagram of the systems and their components found in the articles.

consider the following items: (a) evaluation **Methods** associated with the application of PL in each study; and (b) the **Stages** of the interactive systems design life-cycle in which PL was integrated.

4.3.1 RQ 2.3 - What methods are used to evaluate Plain Language or the systems that adopt it?

Figure 12 highlights the categories associated with the evaluation methods identified in studies. As previously mentioned, when a single article can be associated with multiple codes, the values shown in the figure differ from the total number of studies, as they represent the number of occurrences per code rather than the number of articles. Table 5 provides a more direct view of which methods were used and how many studies fall into each category.

The most recurrent evaluation methods were usability testing (8 articles) and questionnaires (6 articles). This similarity can be explained by their frequent combined use, as usability tests often include questionnaires at some stage of the evaluation process. Other studies employed readability formulas (4 articles), such as the Flesch–Kincaid index, which measures the educational level required to understand a text [Rughani *et al.*, 2021; da Cunha Silva *et al.*, 2024].

In addition, other qualitative methods emerged from the studies, although in smaller proportions, including interviews (4 articles), focus groups (2 articles), and content analysis (3 articles). It is important to note that many of these studies adopted evaluation designs involving two comparison groups, typically one receiving information without PL intervention (control group) and another exposed to content adapted using PL practices. This type of experimental structure is common in medical research, particularly in randomized studies aimed at assessing the effectiveness of clinical treatments.

Overall, studies applying PL, especially during the development stage, rarely report evaluations focused exclusively on PL. In most cases, other aspects, such as accessibility, are also included in the evaluation. As a result, broader methods such as usability testing, focus groups, and interviews are commonly adopted. In contrast, studies specifically aimed at evaluating PL practices tend to employ methods such as expert inspection (4 articles), readability formulas, and questionnaires, being the most recurrent approaches.

4.3.2 RQ 2.4 - In which stages of interactive systems design is Plain Language applied?

The life-cycle of an interactive systems project may vary, but there is general consensus regarding its core stages [Rogers *et al.*, 2013]. The two main stages are development, sometimes referred to as design or prototyping, and evaluation. In addition, earlier and more conceptual stages are often identified, such as ideation or analysis of the current situation. It is important to emphasize that an HCI process is iterative and non-linear; therefore, the stages complement one another, and back-and-forth movement across activities is common.

Within the selected studies, PL was most frequently applied during the evaluation stage (15 articles). The development stage involved PL practices in 7 studies, indicating a more limited but still relevant adoption of PL during system design and prototyping. It is important to note that these counts are not mutually exclusive, as several studies applied

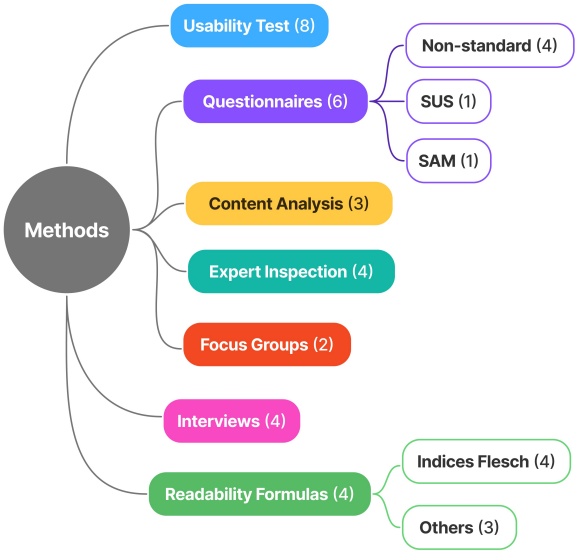

Figure 12. Diagram of the evaluation methods found in the articles.

PL across more than one stage of the interactive system life-cycle. In particular, many studies that incorporated PL during development also proceeded to an evaluation phase in which the same systems were assessed.

4.4 Challenges

4.4.1 QP 3 - What are the challenges or limitations in using Plain Language in interactive systems design?

Four themes emerged from the literature regarding the challenges of using Plain Language (PL) in interactive systems: Evaluation, Expansion, Process, and Critiques. Figure 13 presents these themes and their associated codes.

Within the **Process** theme, we highlight practical challenges related to the application of Plain Language (PL) in interactive systems. PL implementation is often perceived as involving *high cost*, as it depends on an iterative process that requires continuous feedback cycles, revisions, and translations [Parmar *et al.*, 2025; Backowski *et al.*, 2022]. This process may require several *review cycles*, such as what we refer to as *reactive adjustments*, meaning that, based on system evaluations, additional efforts may be required to further simplify content, interaction, or other elements in areas where users experience difficulties, even after the initial simplification [Parmar *et al.*, 2025; Janiak *et al.*, 2013]. Without careful application of PL focused on users' needs, issues tend to be identified later rather than anticipated. This increases rework. In addition, PL-oriented projects also require *continuous maintenance*, involving strategies to ensure that newly added content remains aligned with PL principles Skaggs [2017]; Backowski *et al.* [2022]. This, in turn, demands structured improvement plans, defined goals, and in some cases training initiatives to support a broader and more consistent adoption of PL across stakeholders.

At the same time, the PL application process is characterized by *low scalability*, as it largely relies on manual activities such as data collection and the application of PL practices [Backowski *et al.*, 2022; Nunes *et al.*, 2023; da Cunha Silva *et al.*, 2024]. Although technologies can support scaling efforts, the literature indicates that *limited automation* remains

Table 5. Project: evaluation methods and project life-cycle stage.

Question	Categories	ID Articles
RQ 2.3. Methods	Questionnaires	A05, A10, A11, A15, A17, A18
	Interviews	A01, A10, A15, A17
	Readability Formulas	A03, A06, A08, A18
	Focus Groups	A01, A09
	Content Analysis	A02, A12, A13
	Expert Inspection	A03, A04, A07, A08
	Usability Testing	A01, A05, A06, A10, A15, A16, A17, A18
RQ 2.4 Project Stages	Ideation	A16
	Development	A01, A06, A09, A10, A14, A16, A18
	Evaluation	A01, A02, A03, A04, A05, A06, A07, A08, A10, A11, A12, A13, A15, A17, A18

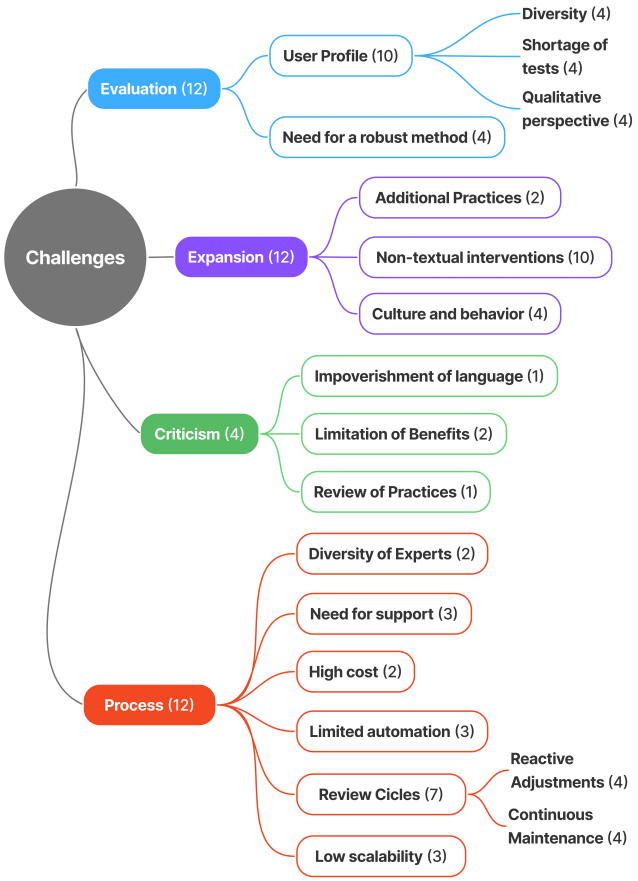

Figure 13. Diagram of the challenges found in the articles.

a significant challenge [Nunes *et al.*, 2023; Bona *et al.*, 2022; Rughani *et al.*, 2021]. This limitation stems from the fact that many PL practices are not rigid rules but rather context-sensitive guidelines, making the overall process highly dependent on situational factors and increasing the cost of developing automated techniques and tools.

Moreover, the literature suggests that the level of developers' expertise directly affects their ability to apply PL techniques effectively [Ginossar *et al.*, 2017; Rughani *et al.*, 2021]. Less experienced developers may struggle to adequately operationalize PL principles. Consequently, the *need for support* becomes evident, encompassing access to appropriate PL materials, instructional guidance, and concrete examples of translations and adaptations [Bona *et al.*, 2022].

Finally, the application of PL practices also benefits from the *diversity of experts*, just as the diversity of system users is essential during evaluation processes. In varied contexts, translators or reviewers from different domains may be better positioned to anticipate potential user difficulties [Martinelli *et al.*, 2023] and, in some cases, may be the only ones capable of accurately validating users' needs or familiarity with the content [Backowski *et al.*, 2022].

The **Evaluation** theme addresses challenges related to how Plain Language is assessed in interactive systems, highlighting limitations in evaluation methods, insufficient user involvement, and difficulties in jointly addressing the core PL principles. Some studies address the *need for a robust method* that encompasses all PL principles, that is, ensuring that the information users need is easy to find, understand, and use [PLAIN, 2026]. Most studies tend to focus on only one or two of these principles. As presented in Section 4.1, only 3 studies focus on the ease with which users can find information. Some works evaluate readability and comprehension but overlook ease of finding information, suggesting that systems may perform well on one criterion while failing on another [Skaggs, 2017; Rughani *et al.*, 2021]. There is also no responsible entity that defines, in a comprehensive manner, quality criteria related to PL practices for user experience in digital services [Nunes *et al.*, 2023]. Although ISO has recently been involved in developing standards in this direction, it remains unclear how specific these standards will be [ISO, 2025]. There is no single, simple test capable of jointly assessing the three principles of the PL definition [Skaggs, 2017], partly due to the diversity of audiences and contexts, which makes comprehensive evaluation more complex and costly.

The *user profile* considered during evaluation is also a challenging issue. Several articles point to difficulties in ensuring *diversity* within evaluation groups to make results more generalizable Parmar *et al.* [2025]; Gibson *et al.* [2020]; Vollenwyder *et al.* [2018]. These difficulties are limitations of the studies and may be related to the challenges of recruitment and management with populations that require specific care, such as people with lower levels of formal education or individuals with disabilities.

Another limitation identified in the studies is the *shortage of tests* involving users. As discussed in Section 4.3, studies that focus exclusively on PL practices often rely on evaluation

Table 6. Challenges and limitations.

Question	Theme	Categories	ID Articles
RQ 3. Challenges	Evaluation	User Profile	A01, A02, A05, A06, A07, A08, A09, A11, A13, A15
		Need for a robust method	A02, A04, A08, A14
	Expansion	Culture and behavior	A02, A04, A08, A17
		Non-textual interventions	A01, A08, A09, A10, A12, A13, A15, A16, A17, A18
		Additional Practices	A02, A07
	Process	High cost	A01, A05
		Low scalability	A03, A04, A05
		Limited automation	A04, A06, A08
		Need for support	A06, A08, A13
		Diversity of Experts	A02, A05
		Review Cicles	A01, A04, A05, A10, A14, A16, A17
	Criticism	Impoverishment of language	A04
		Limitation of Benefits	A03, A11
		Review of Practices	A02

approaches conducted without direct user participation, such as expert inspections and readability formulas. Even studies that include users in testing phases tend to do so in a limited way.

For example, in the study by Bona *et al*. [2022], usability tests were conducted only with experienced researchers, while groups with limited health knowledge were considered for future research. This does not mean that there are no user-centered evaluations in the literature, however, it remains a point of concern that approximately 30% of the studies (6 articles) relied on indirect approaches and did not include users in the evaluation process [Marx and Miller, 2024; da Cunha Silva *et al*., 2024; Nunes *et al*., 2023; Maybury *et al*., 2021; Rughani *et al*., 2021; Paige *et al*., 2018; Ginossar *et al*., 2017]. In addition to the limited scope, the lack of a *qualitative perspective* in the collection and analysis of data in usability tests [Parmar *et al*., 2025; Backowski *et al*., 2022] also restricts the ability to gain deeper insights into users' decisions, motivations, and difficulties encountered.

Within the theme of **Expansion**, the identified codes point to areas or contexts that are usually overlooked in PL research but may reveal valuable insights. Users' *culture and behavior* are often not adequately considered in the selected studies (4 articles). In the work by Nunes *et al*. [2023], the authors argue that PL lacks further investigation in multicultural contexts, highlighting the need for dedicated teams, along with methods and standards, to adapt concepts to cultural and linguistic regional variations.

Similarly, in the study by Janiak *et al*. [2013], the lack of consideration for users' digital literacy and linguistic knowledge led to avoidable issues, particularly among non-native speakers of the study language. These included difficulties in understanding acronyms such as PDF and FAQ, as well as frustrated attempts to access links, which could have been anticipated if such user characteristics had been previously mapped.

Some tools developed to evaluate health information already incorporate additional practices aimed at adapting systems to different contexts and cultures. For example, the use of the SAM (Suitability Assessment of Materials) questionnaire, in the study by Janiak *et al*. [2013] includes a specific item addressing the cultural adequacy of the evaluated content. Similarly, in the work by Langford *et al*. [2020], when considering the IPDAS (International Patient Decision Aid Standards) guidelines, previously discussed in Section 4.1. The authors suggest not only mapping users' cultural and contextual characteristics, but also adapting images and content accordingly. Nevertheless, other studies do not demonstrate the same level of attention, and even research in the health domain could further explore this issue by going beyond isolated adjustments to textual and visual content and considering broader adaptations in system design and interaction.

Another highlight in this study concerns the application of PL principles through *non-textual interventions*. This relates to the integration of PL with practices derived from other HCI domains or with a focus on elements beyond textual content. More than half of the analyzed studies (10 articles) assessed PL principles alongside issues related to usability, interactivity, and visual resources, among other aspects. This finding is particularly relevant, as it highlights that the application of PL extends beyond textual simplification and involves a broader set of design decisions.

Overall, the literature still tends to frame textual simplification as the primary strategy for ensuring that users can find, understand, and use interactive systems. The results of this mapping indicate that this relationship is more complex, since multiple interface elements directly influence the user experience. For instance, in the study by Parmar *et al*. [2025], the authors report that language was not the only aspect valued by participants, who also emphasized visual elements such as layout and color usage.

Similarly, in the work by Gibson *et al*. [2020], although only the textual content was translated into PL, the authors identified comprehension issues related to contextual elements of the graph, reinforcing the need for additional visual support. These findings suggest that the isolated adoption of PL in textual content may be insufficient when visual and interactive elements are not equally addressed during the design process.

In contrast, the study by Summers *et al*. [2014] indicates that the inappropriate use of images in instructional screens produced negative effects, either by distracting participants or by frustrating those who assumed the images were interactive. This evidence demonstrates that the impact of visual elements is highly dependent on context and target audience, increasing the complexity of design decisions.

This last piece of evidence reinforces what some studies have suggested by indicating that *additional practices* (2 articles) derived from other domains can support designers, in specific contexts, in achieving the PL principles. The works by Marx and Miller [2024]; Maybury *et al*. [2021], for instance, show that website evaluations based on the combination of PL practices with specialized web interface guidelines can reduce recurring usability and comprehension issues. In the Brazilian context, PL guidelines such as those proposed by ABEPTIC [2022] already associate PL practices with heuristics grounded in HCI. Although previous studies, including those discussed in Section 2.3, have adopted this approach Oliveira *et al*. [2024], the results of this study indicate that such integration remains limited and represents a relevant opportunity for future research.

Some studies raise **Criticisms** regarding the use of PL. One concern is that the simplification process may lead to *language impoverishment* [Nunes *et al*., 2023]. This criticism is common in this field, particularly within legal and juridical domains, where there are concerns about loss of precision or even defenses of complexity as an intentional rhetorical resource to support readers' learning [**?**]. These arguments are debated by PL researchers, who strongly emphasize their importance and scientific validation as a tool to empower citizens to make conscious and informed decisions, rather than a rigid set of rules intended to produce shorter, infantilized texts without evidence of effectiveness [**??**].

Moreover, some authors highlight *limitations of benefits* of the technique in specific situations (2 articles), such as the use of automatic translation for longer texts [da Cunha Silva *et al*., 2024] or users' subjective preference for PL versions despite lower comprehension scores [Vollenwyder *et al*., 2018]. In the study by [Marx and Miller, 2024], the authors also discuss the need for *revision of some textual practices*, for example, regarding sentence length, which should not be treated as fixed rules but rather adjusted according to the content and the medium used. These codes represent limitations of the studies in question, but also indicate that PL should not be applied indiscriminately, without considering context and adapting its practices to each specific reality.

5 Discussion

To systematize the results and reflect on the findings, we organized a structure into sections that reflect the dimensions of our findings: theoretical-conceptual, methodological, evaluation, tooling, and users and context. The dimensions were interpreted considering the general objective presented in the introduction: to understand how Plain Language practices are addressed in the design of interactive systems in the field of HCI. To this end, Table 7 summarizes the items discussed in the following columns: i) the current landscape of the PL field, derived from the results of the context, scope, and project sections; ii) challenges identified in the literature, derived from the challenges section and reorganized according to the dimensions discussed; and iii) opportunities and future research directions arising from the reflection on the findings and the researchers' understanding of the field. The table provides an overview of the identified aspects, while the following sections focus on the main findings and patterns within each dimension, rather than discussing all items individually.

It is worth noting that this discussion was interpreted in light of the profile of the studies analyzed. In many cases, these studies did not aim to investigate PL as a comprehensive approach to system design, but rather to employ it to address specific communication problems in particular application contexts. Therefore, the research opportunities discussed below should not be interpreted as shortcomings of the original studies, but rather as characteristics of the current stage of maturity of PL research in the field of HCI.

5.1 Theoretical and Conceptual

The predominance of studies focused on the health domain and on the use of PL primarily to improve comprehensibility suggests a still narrow view of the technique, which tends to prioritize textual simplification as the main strategy for ensuring understanding. Although this focus is aligned with the foundational principles of PL [IPL, 2026], the results indicate that other PL principles and user experience attributes, such as the ease of finding information (findability) and the application of PL practices to visual and interactive interface elements, are addressed only sporadically in the analyzed studies [Rughani *et al*., 2021; Langford *et al*., 2020; Summers *et al*., 2014].

This uneven coverage limits a more holistic understanding of PL as a multidimensional approach to information access and use. In particular, the relationship between textual comprehensibility and non-linguistic aspects of interaction, including visual representations and interface structures, remains underexplored and may represent an opportunity for future research within the analyzed literature. Similarly, the limited integration between these dimensions constrains the positioning of PL as a core element of broader quality-of-use criteria (such as usability and communicability), which are often addressed through distinct methodologies despite their conceptual compatibility with PL principles, as presented in the introduction. Moreover, although some studies consider PL practices applied to non-textual elements, methods specifically designed to evaluate or support such applications from a PL-oriented perspective remain scarce, suggesting opportunities to expand existing methods or develop complementary approaches as the field evolves.

There is also an opportunity for deeper integration between PL principles and central HCI theories, such as Semiotic Engineering [de Souza, 2005]. Communicability appears explicitly in only one study [da Cunha Silva *et al*., 2024], despite being a concept that shares theoretical foundations and objectives with PL, as discussed in Section 2.3. This limited overlap suggests that the communicative role of PL in mediating the dialogue between designers and users through system interfaces remains undertheorized in the body of research analyzed. Exploring PL as a means of strengthening metacommunication between systems and users therefore rep-

resents a promising research direction, particularly in contexts of inclusion and transparency. Furthermore, integration with HCI theories could strengthen the technique against existing criticisms identified in Section 4.4 and expand the technique to encompass additional practices, such as heuristics and principles that move toward the PL principles, as some studies have already done [ABEPTIC, 2022; Oliveira *et al.*, 2023] or recommended [Marx and Miller, 2024; Maybury *et al.*, 2021].

5.2 Methodological and Evaluative

From a methodological perspective, PL is more frequently employed as an evaluative resource than as a strategy integrated throughout the conception and development of systems, as discussed in Section 4.3. This may be because the technique is not well known among professionals involved in system development [Coutinho *et al.*, 2025] and has traditionally been applied to documents [Schriver, 2017]. In Brazil, PL has only recently been recommended for system development, as recommended by the National Digital Government Strategy [Brasil, 2024] and Ordinance No. 4,248 [MGI, 2024].

Another relevant point is the variation in how PL is operationalized across studies. In some cases, PL is applied through empirical methods, such as translations performed by experts, while in others it is based on guides or approaches grounded in guidelines and practices, as shown in Table 4. This heterogeneity is not in itself a problem, but it signals a lack of standardization in the field and the need for more rigorous and systematic models that also align PL principles with established HCI design processes, facilitating the comparison and replication of results in the field.

Similarly, research on PL grounded in human-centered approaches throughout the entire design life-cycle remains limited. Although PL explicitly emphasizes the identification of and adaptation to target audiences, few studies directly involve users to determine appropriate linguistic adaptations. Instead, designers often rely on assumptions about users, reserving their involvement for the evaluation stages. This pattern results from the predominance of evaluation-oriented studies identified in this review and does not necessarily reflect a limitation of the PL approach itself. There are studies such as Gibson *et al.* [2020], which follow a design thinking approach with multiple iterations across design and evaluation cycles for an interactive health dashboard. Likewise, the work by Summers *et al.* [2014] adopts a participatory design approach, although it is more focused on the iterative evaluation stages of a voting system prototype. This leads us to reflect on the reasons behind this prevalence, whether the cost of activities involving user participation [Coutinho *et al.*, 2025], which will be further discussed in the following section, or the lack of methods or maturity of the technique when applied to systems, as indicated at the beginning of this section. As PL research in HCI matures, broader investigations encompassing the entire design life-cycle may become more frequent and provide a broader understanding of how PL integrates with and supports user-centered design activities.

5.3 Tooling

From a tooling perspective, the need for automation emerges as a key factor to facilitate the adoption and scalability of PL practices. The study by Nunes *et al.* [2023] indicates that a fully manual process for applying PL in evaluation activities is not ideal, suggesting investments also to support the use of PL throughout interface development. Similarly, Backowski *et al.* [2022] report that the authors spent three months translating and revising the descriptions of a university database into PL. However, automation should support the application of PL rather than replace human activities or decisions regarding PL, that is, decisions that depend on the target audience or context of use. Human judgment should remain essential, while automation is better suited to supporting specific or repetitive tasks. Investing in automation tools or systems that support specific stages of the PL process can promote and accelerate progress in the field, particularly for novice developers and professionals with limited familiarity with the technique. Emerging initiatives employ Artificial Intelligence to support the translation of textual content into PL. Despite their potential, these approaches still lack consistency in translations and adherence to formal PL guidelines [Sastre *et al.*, 2024; Lyu *et al.*, 2023]. These findings suggest that current automation efforts should be understood as complementary support mechanisms rather than substitutes for the contextual and user-centered decisions that characterize PL practice.

5.4 Users and Context

Finally, the body of studies analyzed reveals a tendency to approach PL as a means of addressing the needs of users with specific limitations related to literacy, cognition, or access, which is consistent with the social and inclusive origins of the PL movement, as discussed in Section 4.1. This emphasis also reflects the predominance of studies conducted in health and accessibility contexts within the analyzed corpus. In this scenario, there is limited in-depth investigation into the direct impact of PL practices on the quality of these users' experiences. In general, studies assess multiple factors simultaneously, making it difficult to isolate the specific contribution of PL to system use and user experience [Paige *et al.*, 2018; Harley *et al.*, 2016; Janiak *et al.*, 2013].

Furthermore, user characteristics are presented in the studies only superficially. Some of them highlight the need to consider aspects such as users' cultural context more deeply, emphasizing the importance of adapting concepts to cultural norms, behaviors, and linguistic regionalism [Marx and Miller, 2024; Nunes *et al.*, 2023; Rughani *et al.*, 2021; Janiak *et al.*, 2013]. However, such adaptations are rarely reflected in more comprehensive system-level changes. The study by Vollenwyder *et al.* [2018] suggests adaptive interfaces as a potential strategy to address this challenge, allowing systems to adjust language variations according to user and contextual needs. This is corroborated by evidence presented in the studies and by other authors [August *et al.*, 2024], indicating that when users have access to multiple linguistic versions of the same information, they tend to choose the one that best meets their needs, and their level of familiarity with the topic influences their choice of the ideal text. Although this is not strictly a multicultural scenario, this approach points to a promising direction for addressing this challenge.

Overall, the analyzed studies demonstrate that PL has been gaining relevance in the field of HCI, particularly in domains where clarity, accessibility, and inclusion are needed.

At the same time, the concentration of evidence in specific application domains and design stages indicates that the field has an opportunity to progress: moving beyond merely demonstrating the value of PL in particular contexts toward investigating how it can be integrated more systematically into HCI theories, methods, and tools.

6 Threats to Validity

There are several threats that may affect the quality of a literature review study. Previous works by Petersen *et al*. [2015] and Zhou *et al*. [2016] discuss a range of such threats that should be considered in software engineering research. Below, we discuss the main threats identified in this study and the actions taken to mitigate them:

- **Theoretical validity**: this refers to the researchers' ability to capture what was originally intended [Petersen *et al*., 2015]. In this study, selection bias represents a potential threat [Zhou *et al*., 2016], as the stage was conducted by a single researcher, as described in Section 3.2.1. To mitigate this threat, we used the Parsifal tool to document all applied filters, maintained continuous communication among the researchers to address doubts, and conducted reviews by the remaining researchers, who were not involved in this stage, during consensus meetings to ensure conformity and consistency.
- **Descriptive validity**: this threat concerns ensuring that observations are described accurately and objectively [Petersen *et al*., 2015]. We mitigated potential bias in data extraction [Zhou *et al*., 2016] through a carefully designed process for extracting and coding information from the articles. The process began with a structured extraction form and was subsequently supported by the MAXQDA tool, which ensured traceability and enabled review by other researchers during alignment meetings, as presented in Section 3.2.1. Another potential threat is publication bias, which requires researchers to be attentive to the completeness of the search [Zhou *et al*., 2016]. We sought to ensure broad coverage by including multiple well-established scientific databases, such as Scopus and IEEE. Nevertheless, the results suggest that future studies could also include databases outside the computing domain, particularly those more closely aligned with the health field, such as Pub-med.
- **Interpretive or conclusion validity**: this validity is achieved when the conclusions drawn are reasonable given the available data [Petersen *et al*., 2015]. Again, reliance on a single researcher may pose a threat to proper interpretation. However, this threat was mitigated through the active involvement of experienced researchers, who participated in successive reviews across different stages of the study. It is important to note that not all selected studies had Plain Language as their primary focus. In some cases, PL was used as part of broader interventions or evaluations without being extensively discussed, as previously noted in Section 5. Therefore, the findings should be interpreted as reflecting how Plain Language has been applied and reported in the selected literature, rather than as a comprehensive assessment of the field. Consequently, the identified gaps may indicate areas that have received limited explicit investigation or reporting, rather than an absence of Plain Language-related practices.
- **External validity**: The results of this study should be interpreted considering certain limitations regarding external validity. The predominance of studies in the health field observed in the selected set may have influenced the trends and challenges identified, since other application contexts did not appear more strongly in the selected articles. Furthermore, it should be noted that the results do not encompass all the literature on Plain Language, as this review focused specifically on its intersection with HCI, and the results are not generalizable to all domains of HCI. Additionally, a possible linguistic bias should be acknowledged, since most of the analyzed studies were published in English. Even with inclusion criteria seeking articles relevant to the Brazilian community, this may have restricted the inclusion of contributions from other languages and regions.
- **Repeatability**: this was ensured through a detailed and transparent description of the entire process across the sections of this article, including clear criteria for each stage and explicit actions taken to reduce potential threats. Nonetheless, the study still presents limitations, which are discussed in the conclusion.

7 Conclusion

This article presents a literature review comprised of 18 studies selected through a structured protocol. Guided by the research questions of this study, the selected works were analyzed using a qualitative approach, considering different aspects of the integration of Plain Language (PL) into system design from a Human–Computer Interaction (HCI) perspective. The results provide an overview of how PL has been addressed in HCI-related research, covering application domains, target audiences, methods used, and others. This contributes to mapping current practices, as well as existing gaps and opportunities in the field.

Among the main gaps identified in the adoption of PL, the following results deserve particular attention: (1) the predominance of PL use in textual content, revealing opportunities to further explore visual and interactive aspects; (2) its application being largely concentrated in the evaluation stage, indicating the potential to incorporate PL from the early phases of the design cycle; (3) the limited articulation with established HCI theories; (4) the need for tools that automate or support the application of PL; and (5) the lack of investigations into the direct effectiveness of PL. Taken together, these findings directly address the study's research questions and highlight structural challenges that hinder the broader and more systematic adoption of PL in interactive system design.

Nevertheless, this research is not without limitations. Although the inclusion criteria considered studies published in Portuguese and included the SBC Open Library (SOL), the character limit imposed by its advanced search mechanism required adaptations to the original search string. As a result, the search strategy could not be applied in exactly the same way as in the other databases, which may have affected the retrieval of some relevant studies. The time span adopted for article inclusion also limited the study to some extent, as the

Table 7. Research dimensions, challenges, and future directions for Plain Language in interactive systems

Dimension	Current research landscape	Challenges indicated in the Literature	Opportunities or future directions
Theoretical and Conceptual	Predominance of studies in health, with a focus on textual comprehensibility and limited articulation with theories and UX attributes.	• **Non-textual interventions**: visual and interactive elements are underexplored in PL. • **Additional practices**: demand for practices from other areas to complement PL. • **Revision of practices**: need to revise practices according to the specific context and reality. • **Language impoverishment**: concern about the precision and robustness of the technique.	• **Integration with HCI theories**: explore approaches grounded in HCI theories, such as Semiotic Engineering, to strengthen the role of PL in system design. • **Multidimensional approach**: evolve and mature PL with a focus on integrating textual, visual, and interactive elements of systems. • **PL as an attribute of use quality**: bring PL closer to HCI concepts, such as UX and usability.
Methodological	PL is mainly used in evaluation, with heterogeneous forms of application, generally empirical, and few studies following the entire project cycle.	• **Need for a robust method**: application of PL focused on a single principle, with methods and quality criteria that are not sufficiently comprehensive. • **Review cycles**: successive refinements to achieve good results and continuous maintenance.	• **Integration into the complete design cycle**: develop models that integrate PL principles into established HCI design processes. • **Systematic methods**: support different stages of the project rather than only evaluation. • **User-centered design**: expand user participation throughout the process.
Evaluation	Studies using PL as an evaluation tool predominate, but with little evidence on the specific impact of PL on the user experience.	• **Qualitative perspective**: lack of deeper studies on the impacts of the technique or users' challenges. • **Shortage of tests**: approaches without user participation or focused only on a final evaluation. • **Limitations of benefits**: expected PL benefits are not confirmed in certain contexts of use.	• **Assess the impact of PL**: investigate more specifically the contribution of PL to the quality of the use experience, isolating its effect from other system factors. • **Expand evaluations**: propose longitudinal and qualitative studies to strengthen the robustness of the technique.
Tooling	The application process is primarily manual, with recent initiatives based on Artificial Intelligence still at an early stage for some steps.	• **High cost**: iterative process requiring continuous cycles of translations. • **Low scalability**: broad dependence on manual activities. • **Limited automation**: high cost due to practices that are sensitive to context. • **Need for support**: less experienced developers need more support to apply PL.	• **Tool-supported design**: develop tools to support specific stages of PL application. • **Complementary automation**: support repetitive tasks while maintaining human and contextual decisions. • **PL-aligned AI**: evolve AI-based solutions for translations more aligned with PL guidelines.
Users and Context	Studies focus mainly on vulnerable populations, but neglect an adequate mapping of audience characteristics, such as literacy, culture, or prior knowledge.	• **Diversity of experts**: lack of experts to validate PL practices based on knowledge of users. • **User diversity**: difficulties in including diverse users for more generalizable results. • **Culture and behavior**: users' cultural context or prior knowledge is neglected.	• **In-depth mapping of users**: expand the participation of different user profiles, considering the needs of each group. • **Cultural and contextual factors**: consider culture, behavior, and context of use more deeply in PL approaches. • **Multidisciplinary teams**: integrate experts from different areas to support PL decisions. • **Adaptive interfaces**: explore adaptive approaches to PL, with variations according to the user's profile and context.

focus was exclusively on recent publications. Furthermore, the analysis concentrated on themes directly related to the research questions; a triangulation with other fields of study could uncover additional layers and relationships between PL and adjacent domains, enriching the interpretation of the results.

Future work is expected to expand the selection of studies by conducting targeted searches in specific domains, such as "health literacy." The inclusion of this and other domain-specific terms may ensure broader coverage and reveal new studies in diverse application contexts. Additionally, future research should explore qualitative approaches, such as interviews or workshops with experts from both PL and HCI, to reinforce and deepen the understanding of how these fields can be more effectively integrated. Such efforts may also contribute to the development of guidelines, methods, or tools that support the systematic adoption of Plain Language throughout the entire life-cycle of interactive system design.

Declarations

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Authors' Contributions

Rodrigo dos Santos Oliveira: Conceptualization, Methodology, Formal Analysis, Data curation, Writing (original draft, review and editing), Investigation. **Luciana Cardoso de Castro Salgado**: Conceptualization, Methodology, Writing (review and editing), Supervision. **Claudia Cappelli**: Conceptualization, Methodology, Writing (review and editing), Supervision.

Competing interests

The authors declare that they have no competing interests

Availability of data and materials

The dataset generated in this study is fully available in the Zenodo repository to ensure transparency and replicability and can be accessed at `https://zenodo.org/records/22114059`

Further relevant information

Use of generative AI. The authors declare that the free version GPT 5.5 of the ChatGPT tool [9] was used as an auxiliary tool for translation and grammatical revision. All content presented in this article is original, was carefully reviewed, and was written by the researchers.

Ethical Considerations. This study is a systematic mapping based exclusively on previously published scientific articles and did not involve human participants. Therefore, approval by a Research Ethics Committee was not required under applicable national ethical standards. Nevertheless, all data used were handled responsibly, with due review by the authors.

Citation Diversity Statement. The authors also recognize the importance of promoting diversity and inclusivity in scientific writing. Accordingly, the reference list reflects the multidisciplinary nature of Plain Language research, encompassing contributions from areas such as design, computing, government, linguistics, and related fields, as well as studies from different geographical contexts, including the Global South, and gender diversity in the authors.

[9] https://chatgpt.com/ - Last accessed on 15 September 2026

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