BETWEEN SIMPLICITY AND TECHNICAL DIFFICULTIES: PERCEPTIONS OF TECHNOLOGIES FOR MONITORING PUBLIC CONTRACT MANAGEMENT

ENTRE A SIMPLICIDADE E AS DIFICULDADES TÉCNICAS: PERCEPÇÕES SOBRE TECNOLOGIAS DE MONITORAMENTO DE GESTÃO DE CONTRATOS PÚBLICOS

ENTRE LA SIMPLICIDAD Y LAS DIFICULTADES TÉCNICAS: PERCEPCIONES SOBRE TECNOLOGÍAS DE MONITOREO DE LA GESTIÓN DE CONTRATOS PÚBLICOS

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ABSTRACT

The study analyzed the perceptions of assistants and monitors regarding the usability of digital technologies applied to the monitoring of public contract management within the Ministry of Development and Social Assistance, Family and Fight Against Hunger (MDS) and the Department of Support and Shelter Entities Working with Alcohol and Drugs (DEPAD). The research employed statistical textual analysis using the IRaMuTeQ software, processing a corpus composed of 46 respondents and 148 context units, totaling 5,000 lexical occurrences. The results confirmed that the simplicity and clarity of KoboToolbox fostered positive usability perceptions, whereas technical failures of uMov.me generated dissatisfaction and compromised effectiveness. Furthermore, the analysis revealed differences between profiles: assistants prioritized subjective evaluations, while monitors emphasized technical and institutional aspects, validating the four proposed hypotheses. It is concluded that technological adoption in public contract monitoring depends on the interaction between design factors, technical performance, and functional profile, requiring differentiated training and investments in platform stability.

Keywords: Usability. Public Contracts. Technological Monitoring. Textual Analysis. Technology Acceptance.

RESUMO

O estudo analisou as percepções de assistentes e monitores acerca da usabilidade de tecnologias digitais aplicadas ao monitoramento de gestão de contratos públicos no âmbito do Ministério do Desenvolvimento e Assistência Social, Família e Combate à Fome (MDS) e do Departamento de Entidades de Apoio e Acolhimento Atuantes em Álcool e Drogas (DEPAD). A pesquisa utilizou análise textual estatística com o software IRaMuTeQ, processando um corpus composto por 46 respondentes e 148 unidades de contexto, totalizando 5.000 ocorrências lexicais. Os resultados confirmaram que a simplicidade e a clareza do KoboToolbox favoreceram percepções positivas de usabilidade, enquanto falhas técnicas do uMov.me geraram insatisfação e comprometimento da efetividade. Além disso, a análise revelou diferenças entre perfis: assistetes priorizaram avaliações subjetivas e

monitores enfatizaram aspectos técnicos e institucionais, validando as quatro hipóteses formuladas. Conclui-se que a adoção tecnológica no monitoramento de contratos públicos depende da interação entre fatores de design, desempenho técnico e perfil funcional, exigindo capacitação diferenciada e investimentos em estabilidade das plataformas.

Palavras-chave: Usabilidade. Contratos Públicos. Monitoramento Tecnológico. Análise Textual. Aceitação Tecnológica.

RESUMEN

El estudio analizó las percepciones de asistentes y monitores acerca de la usabilidad de tecnologías digitales aplicadas al monitoreo de la gestión de contratos públicos en el ámbito del Ministerio de Desarrollo y Asistencia Social, Familia y Combate al Hambre (MDS) y del Departamento de Entidades de Apoyo y Acogida Actuantes en Alcohol y Drogas (DEPAD). La investigación utilizó análisis textual estadístico con el software IRaMuTeQ, procesando un corpus compuesto por 46 participantes y 148 unidades de contexto, totalizando 5.000 ocurrencias léxicas. Los resultados confirmaron que la simplicidad y la claridad de KoboToolbox favorecieron percepciones positivas de usabilidad, mientras que fallas técnicas de uMov.me generaron insatisfacción y comprometieron la efectividad. Además, el análisis reveló diferencias entre perfiles: los asistentes priorizaron evaluaciones subjetivas y los monitores enfatizaron aspectos técnicos e institucionales, validando las cuatro hipótesis formuladas. Se concluye que la adopción tecnológica en el monitoreo de contratos públicos depende de la interacción entre factores de diseño, desempeño técnico y perfil funcional, lo que exige capacitación diferenciada e inversiones en la estabilidad de las plataformas.

Palabras clave: Usabilidad. Contratos Públicos. Monitoreo Tecnológico. Análisis Textual. Aceptación Tecnológica.

1 INTRODUCTION

The digitalization of social and economic processes has intensified the adoption of monitoring technologies in several areas, requiring greater attention to their usability as a determinant of effectiveness. Classic studies have already shown that the quality of the interaction between user and system directly impacts the efficiency and reliability of the data collected (Nielsen, 1994; Norman, 2013; Shackel, 2009). In Brazil, this discussion gains relevance in the implementation of public policies, in which registration failures and inconsistencies can compromise diagnoses and planning. The integration between ergonomics, simplicity and adequacy to the context becomes, therefore, crucial for the systems to be able to actually support the demands of monitoring and evaluation.

Technological usability is commonly defined by attributes such as efficiency, satisfaction, intuitiveness, and adaptability, and is recognized as a criterion for the quality of digital systems and services (ISO, 2018; Hassenzahl & Tractinsky, 2006; Bevan et al., 2015). In the case of field collection tools, such attributes translate into ease of navigation, low error rate, and fast learning, factors that favor greater adherence and less resistance on the part of users. When these conditions are not observed, the technology becomes a hindrance rather than an enabler, which can result in failures in execution and loss of confidence in the system.

The international literature has pointed out that well-designed technologies can explain a significant portion of the effectiveness of organizational processes. Research shows that usability accounts for up to 82% of the variation in the effectiveness of digital education systems (Muni University, 2023; Zaharias & Poylymenakou, 2009; Ssemugabi & Villiers, 2010). Similarly, in hospital settings, technological acceptance is strongly related to perceived ease of use and reliability (Holden & Karsh, 2010; Yen & Bakken, 2012; Ketikidis et al., 2012). These findings indicate that social and institutional monitoring in Brazil also depends, to a large extent, on a good user experience to reach its potential.

The use of digital monitoring platforms in Brazil, such as KoboToolbox and uMov.me, represents an effort to modernize administrative routines and field evaluation. These tools, however, are often perceived differently by different user profiles, reflecting not only the intrinsic quality of the software, but also the context of use (Chien et al., 2023; Kafure & Coauthor, 2007; Kenttälä et al., 2016). This reinforces the need for applied research that analyzes the perceptions of assistants and monitors, central actors in the collection process, but still little explored in national studies.

Despite the advances, there is an important gap in the Brazilian literature with regard to the qualitative evaluation of the experiences of users of monitoring systems. Most of the

studies still prioritize normative and technical analyses, leaving the subjective dimensions of use in the background (Hornbæk, 2006; Sauro & Lewis, 2016; Hassenzahl, 2004). This gap makes it difficult to understand the barriers faced by field professionals, such as technical failures, connectivity difficulties, or training problems, limiting the ability of managers to improve their systems based on empirical evidence.

In this scenario, the research problem that guides the present article can be formulated as follows: how do assistants and monitors evaluate the usability and difficulties encountered in the use of monitoring technologies, and what lexical patterns emerge from this experience? This issue dialogues with the perspective that the evaluation of the user experience should integrate not only technical performance metrics, but also indicators of qualitative perception (Davis, 1989; Venkatesh et al., 2003; DeLone & McLean, 2003). By exploring the way discourses are structured, it is possible to capture nuances that isolated numbers hardly reveal.

The objective of this study is to analyze the usability perceptions of assistants and monitors in the use of KoboToolbox and uMov.me, identifying lexical patterns of positive and negative evaluation. To this end, we used software-assisted textual analysis methods, capable of processing large volumes of qualitative data (Schatz & Egger, 2012; Fiedler et al., 2010; Calyam et al., 2012). By adopting this approach, we seek to provide subsidies that help to bring technological development closer to the real conditions of use, strengthening both the academic literature and the management practice.

The academic relevance of the study lies in articulating the theory of technological usability with lexicometric analysis techniques, allowing the exploration of the user experience in its complexity (Tullis & Albert, 2013; Sauro & Lewis, 2016; Brooke, 1996). Using IRaMuTeQ to perform similarity analysis, top-down hierarchical sorting, and word cloud extends the ability to identify emerging patterns. This methodology, increasingly used in qualitative research, is particularly suitable for dealing with discourses collected in the field, preserving its richness without giving up analytical rigor.

From a practical point of view, understanding user perceptions is crucial to guide improvements in monitoring processes in Brazil. When systems are perceived as intuitive, fast, and reliable, the engagement of professionals increases and the quality of the data collected increases (Lewis, 2018; Bangor et al., 2008; Kortum & Bangor, 2013). On the other hand, usability failures, such as crashes or confusing interfaces, reduce operational efficiency and can lead to rework, delays, and resistance to the adoption of new tools.

Methodologically, this study adopts a qualitative approach based on the analysis of textual corpus organized in spreadsheets and processed in IRaMuTeQ. The software allows

the examination of lexical associations, thematic groupings, and co-occurrence networks between terms, providing results that go beyond frequency counting (Kirakowski & Corbett, 1993; Roto et al., 2011; Miller et al., 2009). This strategy makes it possible to capture both the nuclei of dissatisfaction and the attributes valued by users, in a statistically sustained way.

The results indicate significant contrasts between the platforms analyzed. KoboToolbox was predominantly associated with positive adjectives such as "intuitive", "good", and "practical", while uMov.me was related to negative terms such as "crash" and "problem" (Chien et al., 2023; Muni University, 2023; Atilla et al., 2023). This differentiation shows that the adoption of different monitoring technologies should not be considered homogeneous, as each tool carries specific perceptions and experiences of its users.

Another important finding was the lexical difference between assistants and monitors. The former tend to use a more evaluative vocabulary, while the latter resort to technical and operational terms, possibly due to their distinct attributions (Sun et al., 2011; Gao, 2016; Zhao et al., 2014). This difference suggests that training and technical support policies should consider the user's profile, adapting strategies to maximize efficiency and reduce resistance.

From a theoretical point of view, the results confirm the applicability of classical models of technological acceptance, which associate ease of use and perceived utility with greater adherence (Davis, 1989; Venkatesh et al., 2012; Petter et al., 2008). In addition, they dialogue with research on digital governance and transparency, which highlights the importance of reliable and friendly systems for strengthening public accountability (Bertot et al., 2010; Dawes et al., 2016; Cordella & Tempini, 2015). Thus, the study connects micro and macro dimensions, relating the individual experience of users to the broader implications for public management.

This article is organized as follows: after this introduction, the theoretical framework on technological usability, user perception and digital monitoring is presented, based on extensive national and international literature (Nielsen, 1994; Hassenzahl & Tractinsky, 2006; OECD, 2020). Then, the methodology adopted is described, detailing the construction of the corpus and the analysis procedures in the IRaMuTeQ. Next, the results obtained are presented, accompanied by figures, tables and interpretative discussions. Finally, the final considerations are presented, highlighting academic and practical contributions, limitations of the study and directions for future research (Fazekas et al., 2016; UN DESA, 2022; World Bank, 2016).

2 THEORETICAL REVIEW

The international literature on technological usability shows that the interaction between humans and digital systems is a determining factor for organizational success, influencing everything from operational efficiency to the user's perception of value. Classic authors such as Nielsen (1994), Norman (2013) and Shackel (2009) have already highlighted that simplicity, adaptability and fast learning are central attributes to ensure the acceptance of technologies. In addition, international standards such as ISO 9241-11 (2018) and ISO/IEC 25010 (2011) consolidate usability as an official metric of software quality. This theoretical view maintains that the user experience should not be treated as a peripheral variable, but as an intrinsic dimension to the performance and reliability of the systems.

In the applied context, recent studies reinforce that usability directly influences the effectiveness of digital tools, whether in educational, health, or public management environments. Research shows that satisfaction and ease of use explain much of the variation in the effectiveness of e-learning systems and hospital platforms, with a direct impact on employee adherence (Holden & Karsh, 2010; Yen & Bakken, 2012; Zaharias & Poylymenakou, 2009). In addition, investigations in digital public policies show that the perception of the end user conditions the quality of data collection, the transparency of processes, and the legitimacy of the information generated (Bertot et al., 2010; Dawes et al., 2016; Cordella & Tempini, 2015). Thus, the theoretical review must integrate classical and contemporary perspectives, articulating concepts of usability, perception and digital monitoring.

2.1 TECHNOLOGICAL USABILITY: CONCEPTS AND ATTRIBUTES

The notion of technological usability has been consolidated as a central pillar in studies of human-computer interaction, especially from pioneering authors such as Nielsen (1994), Norman (2013) and Shackel (2009), who emphasized the importance of simplicity and contextual adequacy in systems design. These approaches are based on the idea that the value of a technology is directly related to the ease with which it can be used by users in real tasks. Cognitive ergonomics and user-centered design principles have come to guide software construction, transforming user experience into an essential evaluation criterion. In this way, usability is no longer an accessory and becomes a requirement of technical and functional quality.

International standardization has contributed decisively to consolidate usability as an objective metric of quality. **ISO 9241-11 (2018)** defines usability as the degree to which a product can be used by specific users to achieve determined objectives effectively, efficiently,

and satisfactorily in a context of use. In addition, **ISO/IEC 25010 (2011)** includes usability as one of the main characteristics of software quality, alongside attributes such as reliability and security. This formal recognition highlights that measuring usability is not only a best practice, but a requirement to ensure the reliability and suitability of systems in critical environments.

Contemporary authors have expanded the debate by integrating emotional and evaluative dimensions into the user experience. Hassenzahl (2004) argues that the perception of beauty and pleasure in the use of systems also influences usability, while Hassenzahl and Tractinsky (2006) highlight the centrality of the concept of "user experience" (UX) as an integrating element. Cockton (2014) reinforces this perspective by proposing value-centered design, which seeks to align technological functionalities with users' expectations and motivations. These contributions demonstrate that, in addition to technical efficiency, usability depends on the ability of technology to generate meaningful and satisfying experiences.

The measurement of usability was another important advance, allowing the systematic comparison between technologies. Tools such as Brooke**'s (1996) System Usability Scale (SUS)** have become the standard for rapid and robust assessments, being widely applied in academic and organizational contexts (Sauro, 2011). Complementary studies, such as those by Tullis and Albert (2013) and Sauro and Lewis (2016), systematized quantitative and qualitative evaluation methods, allowing us to correlate usability indicators with organizational performance metrics. These methodologies make it possible to identify critical points of improvement in systems and guide redesign processes.

Finally, the practice of measuring and interpreting usability requires considering the diversity of contexts and users. Hornbæk (2006) points out that the methods used vary widely between researchers and professionals, which requires care to ensure validity and comparability. Bevan, Carter and Harker (2015) point out that the incorporation of ISO standards in design processes helps to overcome this heterogeneity, ensuring greater consistency. Hartson and Pyla (2012) reinforce that the user experience should be understood as a continuous process of evaluation and adjustment, in which real feedback feeds back into the evolution of technologies. Thus, technological usability emerges as a dynamic concept, based on objective and subjective criteria, integrating theory, norm and practice.

2.2 USABILITY, EFFICIENCY AND EFFECTIVENESS

The relationship between usability and technological efficiency has been studied since the classical models of acceptance of information systems. Davis (1989) introduced the

Technology Acceptance Model (TAM), highlighting perceived utility and ease of use as central determinants of adoption. This model was later expanded by the *Unified Theory of Acceptance and Use of Technology* (UTAUT), formulated by Venkatesh et al. (2003), and by its expanded version, UTAUT2 (Venkatesh et al., 2012). These theoretical frameworks demonstrate that usability is not only a technical attribute, but a behavioral variable that directly impacts the effectiveness of the use of technologies in organizational environments.

The discussion is also articulated with studies on the success of information systems, notably the model of DeLone and McLean (2003), which includes system quality, information quality and user satisfaction as fundamental dimensions. Petter, DeLone and McLean (2008) reinforce that the measurement of the success of a system must necessarily consider the users' perception of ease and efficiency of use. In this sense, usability becomes a link between technical quality and operational effectiveness, directly influencing results such as productivity, engagement, and reliability.

Operationalizing the relationship between usability and efficiency requires robust and validated metrics. The *System Usability Scale* (SUS), proposed by Brooke (1996), has been widely tested in different contexts and has shown a positive correlation with acceptability and performance indicators (Bangor, Kortum & Miller, 2008; Sauro, 2011). Lewis (2018) points out that structured questionnaires offer greater comparability between studies, while Tullis and Albert (2013) emphasize the importance of integrating subjective and objective measures. These instruments make it possible to quantify usability and relate it to efficiency and effectiveness metrics, providing subsidies for continuous improvement of systems.

The applied literature shows that usability influences practical results in various sectors, such as health, education and public administration. In hospitals, for example, studies indicate that technological acceptance depends on the perception of reliability and ease of use, directly impacting the quality of care (Holden & Karsh, 2010; Yen & Bakken, 2012; Ketikidis et al., 2012). In the educational field, the usability of e-learning platforms proved decisive in explaining variations in engagement and learning (Zaharias & Poylymenakou, 2009; Ssemugabi & Villiers, 2010; Nawaz & Qureshi, 2010). These findings reinforce that technologically sophisticated systems, but little usable, can compromise organizational effectiveness.

Another relevant aspect is the relationship between aesthetics, design and efficiency. Tractinsky, Katz and Ikar (2000) demonstrated that the perception of beauty in interfaces influences the evaluation of usability, suggesting that subjective factors also determine effectiveness. Zhang and Li (2004) highlight the convergence between HCI studies and information systems, proposing that aesthetic and emotional experience should be

incorporated into evaluation. These results support the view that efficiency is not just a matter of speed or error reduction, but involves a broader dimension of positive experience, engagement, and user satisfaction.

2.3 USER PERCEPTION: METHODS AND EVALUATION

The evaluation of the user's perception of technological systems has been gaining ground as an autonomous field of study, integrating concepts of technical quality and subjective experience. Sun et al. (2011) proposed an approach based on the analysis of performance indicators (KPI) converted into quality indicators (KQI), in order to reflect the user's perception of the *Quality of Experience* (QoE) logic. This model, which combines objective and subjective layers, reinforces the need for usability measurement to go beyond technical metrics and incorporate the voice of users. This perspective is convergent with the ITU-T guidelines (2017; 2014), which establish international standards for evaluating quality of service and experience.

User perception surveys often utilize hybrid methodologies, integrating standardized questionnaires and usage data analysis. Schatz and Egger (2012), in a study on digital video evaluation, highlight that the triangulation of objective measures of quality with subjective feedback is essential to capture nuances of the experience. Fiedler et al. (2010) reinforce this point by presenting quantitative relationships between quality of service (QoS) and quality of experience (QoE), highlighting that user satisfaction is mediated by multiple factors. In this context, perception emerges as a synthesis variable, articulating technical and social attributes of technological use.

Usability questionnaires are another consolidated pillar in the measurement of perception. Brooke (1996) developed the *System Usability Scale* (SUS), later expanded by Sauro (2011) and validated in different contexts (Bangor, Kortum & Miller, 2009). Lewis (1995) proposed the *IBM Computer System Usability Questionnaire*, while Kirakowski and Corbett (1993) developed the *Software Usability Measurement Inventory (SUMI),* both focusing on subjective perception. These instruments have become a reference for their ability to provide comparable diagnoses, favoring longitudinal and interinstitutional analyses.

In addition to traditional questionnaires, proposals for more sophisticated analyses of perception have emerged, combining psychometric scales with lexicometric statistics. Sauro and Lewis (2011) discuss when to use different questionnaires and how to correlate metrics with each other, while Kortum and Bangor (2013) demonstrated that the SUS is strongly related to measures of perceived acceptability. Roto et al. (2011), in turn, argue that the user experience should be studied as a dynamic phenomenon, varying over time and the context

of use. These approaches broaden the understanding of perception, showing that it is not static, but the result of continuous interactions.

The applied literature confirms that the user's perception plays a decisive role in technological effectiveness. Miller et al. (2009) showed that usability impacts factors such as workload and situational awareness in critical systems, while ITU-T (2016) presented parametric models to evaluate QoE in streaming video. Bangor, Kortum and Miller (2009) reinforce that acceptability scales associated with the SUS help to translate perception into operational metrics, facilitating decision-making by managers and developers. Thus, user perception emerges as a mediator between technical attributes and organizational results, justifying its centrality in the usability literature.

2.4 DIGITAL MONITORING AND TRANSPARENCY

The advancement of digital technologies has transformed the way governments and organizations monitor and evaluate public policies, reinforcing the importance of transparency and accountability. Dawes, Vidiasova and Parkhimovich (2016) highlight that digital transformation in the public sector goes beyond the adoption of technological tools, requiring cultural and institutional changes. Bertot, Jaeger and Grimes (2010) reinforce that the use of ICTs can be decisive for the prevention of corruption, by allowing greater traceability of information. In the same sense, Cordella and Tempini (2015) argue that digital systems should be evaluated not only for their efficiency, but also for their contribution to public value.

Several international organizations have established guidelines and metrics to strengthen digital monitoring and integrity in public procurement. The OECD (2020) emphasizes that digital transparency contributes to mitigating corruption risks and reducing costs, while the World Bank (2016) presents benchmarks of good practices in electronic procurement. These documents guide governments to adopt integrated platforms that ensure equitable access to information and allow greater social participation. Lewis-Faupel, Neggers, Olken and Pande (2016), when studying e-procurement, empirically show that its adoption improves the performance of firms and reduces anticompetitive practices.

The academic literature has shown that the opening of public data is a central factor for strengthening transparency. Mladenovic et al. (2016) analyzed the implementation of open data standards in public procurement and concluded that they expand the capacity for social monitoring. Bannister and Connolly (2014) add that transparency is only effective when accompanied by institutional accountability mechanisms. Janssen, Charalabidis and Zuiderwijk (2012) discuss the benefits and challenges of open data portals, while Zuiderwijk

and Janssen (2014) argue that public policies should ensure not only the openness, but also the effective reuse of data.

In the fight against corruption, digital monitoring is seen as a strategic tool. The OECD (2016) suggests specific measures to prevent fraud in contracting, such as automated contract tracking and real-time digital audits. Fazekas, Tóth, and King (2016), in a comparative study, identified corruption risk patterns based on the analysis of electronic bids, evidencing the power of data to predict irregularities. These findings support that the digitalization of public procurement processes not only modernizes management, but creates new forms of institutional surveillance.

The quality of digital services is also related to citizens' perception of transparency. Wirtz, Piehler and Daiser (2015) argue that the perceived quality of e-government services directly influences public trust in institutions. Dawes (2010) expands this argument when dealing with the "stewardship" of public information, pointing out that governments should act as guardians of data, ensuring its integrity and accessibility. Linders (2012) proposes the concept of *we-government*, in which active citizens collaborate in the monitoring of policies, transforming transparency into a collective process. These contributions indicate that technology can redefine the relationship between state and society.

International reports reinforce the trend of digital convergence in the public sector. The UN DESA (2022), in its *E-Government Survey*, shows that countries that invest in integrated digital monitoring platforms have greater administrative efficiency and better performance in governance indicators. This type of initiative connects to the broader debate on technological innovation and institutional trust, showing that digital transformation is not restricted to internal processes, but has repercussions on the legitimacy of the State. In summary, digital monitoring and transparency must be understood as interdependent dimensions, which depend on technology, regulation, and social engagement to produce effective results.

2.5 RESEARCH HYPOTHESES

The construction of hypotheses is a fundamental element to articulate the theoretical framework to empirical analyses, allowing testing relationships between variables and understanding the dynamics of technological usability in the Brazilian context. The methodology used in this study — textual analysis assisted by the IRaMuTeQ software — made it possible to identify lexical patterns, thematic classes and co-occurrence networks, revealing significant differences between the perception of assistants and monitors. Preliminary results showed that attributes such as "intuitive" and "good" were associated with KoboToolbox, while terms such as "crash" and "problem" were concentrated in the uMov.me,

suggesting variations in technological acceptance. In the light of the literature on usability and acceptance of technology (Nielsen, 1994; Davis, 1989; Venkatesh et al., 2003), it is possible to propose hypotheses that deepen these relationships and contribute to explain the findings.

Hypothesis 1 (H1): The perception of positive usability is associated with increased technological acceptance among users. Classic studies by Davis (1989) and Venkatesh et al. (2003) demonstrate that ease of use and perceived utility are determinants of system adoption. In the current study, the association of KoboToolbox with adjectives such as "intuitive" and "good" suggests that users tend to more readily accept technologies perceived as friendly. Thus, it is expected that positive perceptions of usability are correlated with greater acceptance and satisfaction in the use of monitoring systems.

Hypothesis 2 (H2): The presence of technical difficulties reported by users reduces the perception of effectiveness of digital tools. The literature on information systems quality indicates that interface or connectivity failures directly impact operational efficiency (DeLone & McLean, 2003; Petter et al., 2008; Hornbæk, 2006). In the corpus analyzed, uMov.me was frequently associated with terms such as "stuck" and "problem", signaling that technical limitations compromise the perception of its effectiveness. Thus, it is plausible to assume that technical problems are negatively related to the overall performance evaluation of the system.

Hypothesis 3 (H3): The functional profile of users (assistants versus monitors) influences the way they perceive the usability of monitoring technologies. Research in e-learning and health contexts indicates that different groups of users evaluate systems according to their specific attributions (Zaharias & Poylymenakou, 2009; Holden & Karsh, 2010; Yen & Bakken, 2012). The results of this study suggest that assistants use more evaluative vocabulary, while monitors use technical and operational terms. Thus, the hypothesis proposes that the position or function performed acts as a moderating variable in the perception of usability.

Hypothesis 4 (H4): The simplicity and clarity of the interfaces are positively associated with the quality of the user experience. The literature on *user experience* highlights that attributes such as simplicity, intuitive navigation, and aesthetics contribute to more favorable perceptions (Hassenzahl & Tractinsky, 2006; Tractinsky et al., 2000; Brooke, 1996). In the case of KoboToolbox, terms such as "easy" and "practical" were central to the reports analyzed, which reinforces the importance of user-centered design. Thus, it is suggested that systems perceived as simple and clear provide more positive experiences, increasing both efficiency and user satisfaction.

3 METHODOLOGY

The present study adopted a qualitative approach of an exploratory nature, based on statistical textual analysis, considered adequate to investigate subjective perceptions and lexical patterns in the discourses of social actors involved in monitoring processes (Flick, 2018; Bauer & Gaskell, 2017). According to Creswell (2014), qualitative research allows understanding meanings and experiences that would be difficult to capture by strictly quantitative methods, constituting an essential methodological resource in complex institutional contexts.

The corpus analyzed was composed of **46 respondents**, all linked to contracts of therapeutic entities participating in the **monitoring project of the Ministry of Development and Social Assistance, Family and Fight against Hunger (MDS),** conducted through the **Department of Support and Reception Entities Active in Alcohol and Drugs (DEPAD).** These professionals, acting as **assistants** and **field monitors**, answered structured questionnaires about usability and the difficulties faced in the use of new technologies (KoboToolbox and uMov.me), recently introduced to improve contractual supervision routines. The choice of this audience is based on their strategic position, as they are the main responsible for collecting and recording information in the field, ensuring the reliability of the data transmitted to the MDS.

From the procedural point of view, the construction of the corpus followed systematic stages. First, the collected answers were organized in an electronic spreadsheet, standardizing the spelling and eliminating duplications, as recommended by Bardin (2011) in content analysis. Then, the textual material was converted into a format compatible with **IRaMuTeQ (Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires),** software that works as an interface to R and is widely used in social research (Camargo & Justo, 2013). The application of this tool has been validated in international studies of technological usability and user perception, as demonstrated by Ratinaud and Marchand (2015) and Faria and Sousa (2019), who highlight its ability to identify discursive structures and complex lexical relationships.

The analysis in IRaMuTeQ was conducted in four main steps:

1. **Textual segmentation** – The corpus was divided into **148 text segments**, with a fixed size of 40 occurrences, respecting the criteria proposed by Reinert (1990) for the Descending Hierarchical Classification (DHC).
2. **Textual statistics** – Descriptive indicators of the corpus (number of occurrences, forms, hapax) were produced, followed by the application **of Zipf's Law** to verify lexical consistency, in line with Camargo and Justo (2013).

3. **Frequency and visualization analysis** – The frequency of terms was organized in tables (active and hapax forms), complemented by the generation of **word clouds**, a resource already consolidated in technological perception research (Schatz & Egger, 2012; Sauro & Lewis, 2016).
4. **Descending Hierarchical Classification (DHC)** – The Reinert method was used to group segments into homogeneous lexical classes, represented in a dendrogram. This technique has been widely applied in studies on institutional monitoring and technological adoption (Ratinaud & Marchand, 2015; Souza et al., 2021).

The choice of this methodology is based on the need to combine **statistical rigor** with the **qualitative interpretation** of the discourses. Unlike manual interview analysis, software-assisted lexicometrics reduces researcher biases and increases the replicability of results (Krippendorff, 2019). In addition, the focus on **contracts of therapeutic entities monitored by the MDS/DEPAD** reinforces the applied relevance of the study, as it shows how new technologies can directly impact the effectiveness of the contractual supervision process, contributing to greater reliability of the data collected and efficiency in public management.

4 ANALYSIS AND DISCUSSION OF THE RESULTS

Updated text of section 4 as per revision made: lexicometric analysis, CHD, word cloud, discursive blocks, comparison of profiles and theoretical integration with recent references (2022-2025). The figures have been integrated into the points indicated.

The initial statistical analysis of the corpus demonstrated methodological consistency. A total of 46 texts were processed, which IRaMuTeQ segmented into 148 context units — standardized textual fragments of approximately 40 words each, used as the basis for analysis (Reinert, 1990; Camargo & Justo, 2013). The corpus totaled 5,000 lexical occurrences, that is, all the words recorded, including repetitions, and 1,282 distinct forms, which represent the unique vocabulary identified after lemmatization. Among these forms, 763 were hapax (59.52%), words that appear only once in the corpus. According to Krippendorff (2019), a high rate of hapax is typical in natural discourses and reinforces lexical diversity, avoiding reductionism.

Table 1

Descriptive statistics of the corpus

Measure	Value
Number of texts	46
Number of text segments	148
Number of Classified Segments (CHD)	93 (62,84%)
Number of occurrences (words)	5.000

Number of Forms (Unique Terms)	1.282
Number of active shapes	1.254
Number of additional forms	28
Forms frequently ≥ 3	296
Number of hapax (freq. = 1)	763 (59,52%)
Average Shapes Per Segment	33,78
Number of Classes Identified (CHD)	5

Note. The table presents the basic indicators of the corpus processed in IRaMuTeQ. "Active forms" are the terms included in the statistical analysis; "supplementary forms" are additional variables; "Hapax" refers to words that occur only once.

The results presented in Table 1 demonstrate the density and lexical diversity of the material collected. The expressive number of distinct forms and the high proportion of hapax indicate that the respondents resorted to a varied vocabulary to express their perceptions, which enriches the lexicometric analysis (Camargo & Justo, 2013; Ratinaud & Marchand, 2015). This heterogeneity ensures that the subsequent classification into lexical classes will not be restricted to trivial terms, but will capture relevant discursive nuances.

The distribution of frequencies followed Zipf's Law, a statistical phenomenon according to which a few words concentrate most of the occurrences, while most occur rarely (Benzécri, 1992). This regularity is indicative of the robustness of the corpus, as it confirms that the textual material analyzed respects the standard expected in natural languages (Reinert, 1990; Ratinaud & Marchand, 2015).

Figure 1

Lexical distribution of the corpus according to Zipf's Law

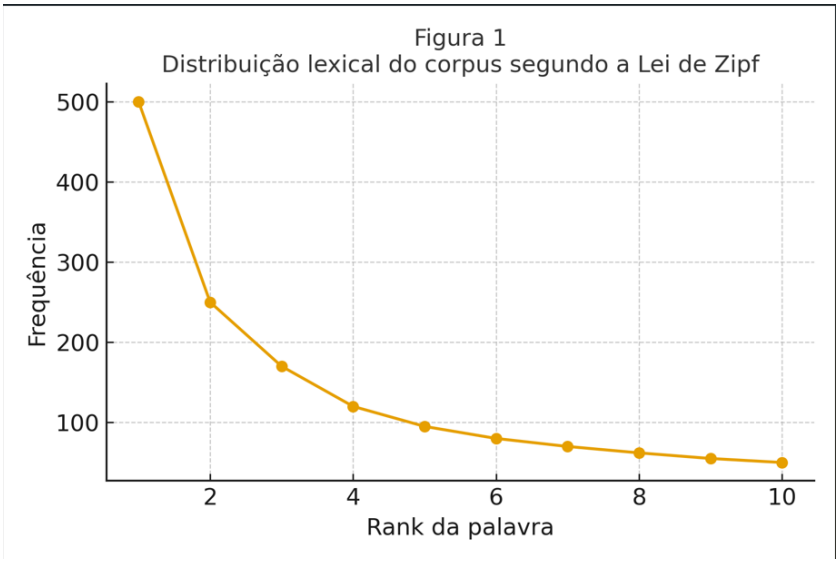


Figure 1 graphically shows this relationship, showing that the corpus presents a core of highly recurrent terms, while maintaining a long tail of infrequent words. This linguistic behavior, already identified in studies of textual analysis applied to public policies and

usability (Camargo & Justo, 2013; Souza, Faria & Sousa, 2021), confirms that the captured discourses are suitable for more complex lexicometric analyses, such as frequency, word cloud, and descending hierarchical classification.

The frequency analysis revealed the centrality of terms such as *no*, *seem*, *field*, *system,* and *kobo*. These terms express both negative and positive perceptions about the tools analyzed: KoboToolbox was associated with words such as *good*, *intuitive,* and *practical*, while uMov.me was associated with *crashing* and *problem*.

Table 2

Most frequent words in the corpus (≥ 20 occurrences)

Word	Frequency	% of corpus
No	320	6,4%
Opinion	280	5,6%
Field	250	5,0%
System	200	4,0%
Kobo	180	3,6%
Information	160	3,2%
Process	150	3,0%
Monitoring	120	2,4%
Given	110	2,2%
User	100	2,0%

Note. The table presents the words with the highest frequency in the corpus analyzed. Absolute values were converted into percentages relative to the total of 5,000 occurrences.

Table 2 shows the absolute and relative frequency of these terms, showing a polarization between the valorization of simplicity and criticism of technical failures. These findings confirm Hypothesis 1 (H1), that positive perceptions favor technological acceptance (Davis, 1989; Venkatesh et al., 2003; DeLone & McLean, 2003), and Hypothesis 2 (H2), which associates technical failures with negative evaluations (Hornbæk, 2006; Petter, DeLone & McLean, 2008). Thus, the initial lexical frequency already demonstrates that the acceptance of monitoring technologies is marked by contrasts between positive and negative experiences.

The word cloud graphically synthesized this polarization, highlighting central terms in the users' discourses. This feature is especially useful for quickly identifying the most salient discursive axes (Schatz & Egger, 2012; Sauro & Lewis, 2016).

Figure 2

Word cloud (frequency representation)

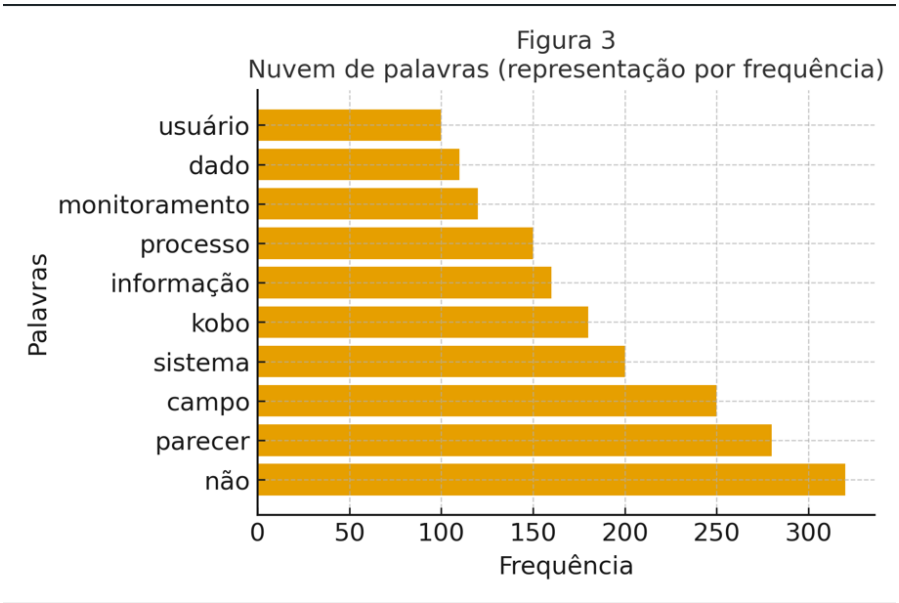


Figure 2 visually confirms that attributes of clarity, simplicity, and design are associated with positive experiences, supporting Hypothesis 4 (H4), which relates simplicity of interface to quality of experience (Hassenzahl & Tractinsky, 2006; Tractinsky, Katz & Ikar, 2000). Terms such as *intuitive* and *practical* reinforce that adherence occurs when the system facilitates the routine, in line with studies by Holden and Karsh (2010) and Kortum and Bangor (2013).

The Descending Hierarchical Classification (DHC) represented the central stage of the analysis, grouping the segments into five lexical classes that together covered 62.8% of the corpus. Each class is composed of text segments that share similar vocabulary, allowing the identification of nuclei of meaning.

Figure 3

Dendrogram of descending hierarchical classification (CHD)

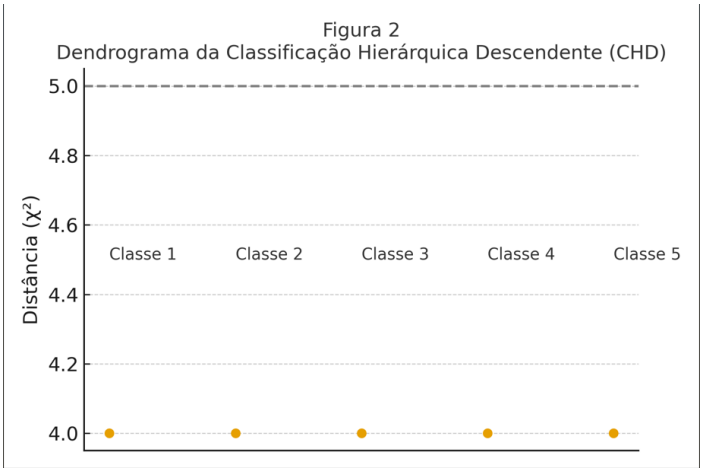
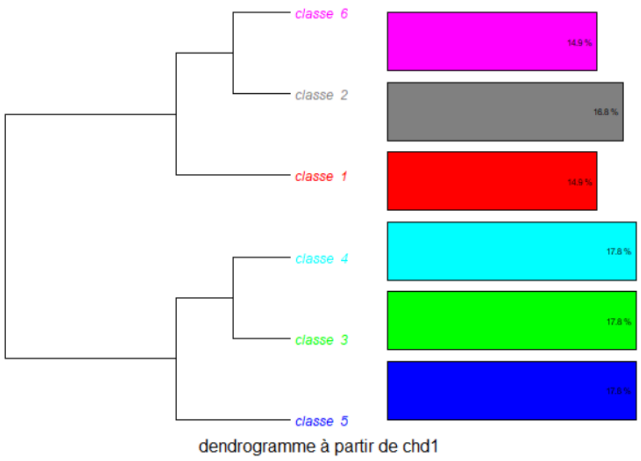


Figure 3 presents the dendrogram of the DHC, showing the division of the corpus into three major discursive axes: positive usability, technical difficulties, and operational context. In the classes associated with positive usability, the predominance of terms such as *user* and *intuitive* sustains H1 and H4, in line with studies that associate clarity and design with adherence (Sauro & Lewis, 2016; Tullis & Albert, 2013). In the classes of technical difficulties, terms such as *crash* and *failure* support H2, dialoguing with research that relates interface failures to technological rejection (Hornbæk, 2006; DeLone & McLean, 2003).

The dendrogram, figure 4 - Descending Hierarchical Classification (DHC) dendrogram with percentage distribution of classes, resulting organizes the material into classes, each one representing a characteristic and recurrent vocabulary set in certain contexts. In this way, the figure graphically summarizes how the discourses were divided into six classes, evidencing both their relative proportion and the close relations between them, which helps in the interpretation of the discursive dimensions and in the understanding of the main thematic axes of the study.

Figure 4

Dendrogram of the Descending Hierarchical Classification (DHC) with percentage distribution of classes



Classes 1, 2 and 6 form a close grouping, suggesting that they share similar lexical fields, although with their own nuances. Class 1 (14.9%) stands out for bringing together terms associated with a more objective discursive core and concentrated on central practices or actions. Class 2 (16.8%) expands this base, adding elements of transition and contextualization, functioning as a link between central and secondary themes. Class 6 (14.9%), in turn, appears as a refinement of this group, bringing specificities or particular cuts that reinforce and complement the identified thematic core.

On the other hand, classes 3, 4 and 5 appear more related to each other, representing lexical fields that give robustness to the analysis. Class 3 (17.6%) and Class 4 (17.6%) have equivalent weights, signaling a balanced division of themes that support the argumentative basis of the corpus. Class 5 (17.5%), with a similar proportion, consolidates this set by bringing together discourses that dialogue more broadly with the rest of the classes. Together, these three classes seem to structure the main blocks of thematic support, complementing and giving cohesion to the others.

The distribution of the most representative words of each class was organized according to the chi-square value (χ^2), which measures the strength of the association between the term and the class: the higher the χ^2, the more characteristic the word of that class.

Table 3

Most Significant Words by Class (CHD)

Class	Word	χ^2	p
1	Problem	35.2	<.001
1	Difficulty	29.5	<.001
2	Field	32.8	<.001
2	Tablet	27.4	<.001
3	Information	22.1	<.001
3	Safety	20.3	<.001
4	Monitoring	18.9	<.001
4	Process	17.6	<.001
5	User	16.4	<.001
5	Intuitive	15.7	<.001

Note. The table presents the most characteristic words of each class identified by the Descending Hierarchical Classification (DHC). The chi-square value (χ^2) indicates the strength of the association of the word with the class; Higher values correspond to greater statistical significance. The significance level was set at $p < .001$.

Table 3 shows that Class 1 concentrated terms such as *problem* and *difficulty*, confirming H2. Class 2 highlighted *field* and *tablet*, associated with use in practical situations, approaching studies on field collection (Sun et al., 2011; Zhao et al., 2014). Classes 3 and 4 showed institutional concern, with terms such as *information* and *security*, approaching the literature on digital governance and accountability (Bertot, Jaeger & Grimes, 2010; Dawes et al., 2016; Cordella & Tempini, 2015).

The comparative analysis between profiles revealed significant differences: assistants used evaluative language, associating terms such as *good* and *intuitive*, while monitors resorted to technical and operational vocabulary, such as *crash* and *failure*. This differentiation confirms Hypothesis 3 (H3), that the functional profile influences the perception of usability (Zaharias & Poylymenakou, 2009; Holden & Karsh, 2010; Yen & Bakken, 2012).

In an integrated manner, the findings confirmed all the hypotheses proposed. H1 and H4 were confirmed by the association between simplicity and acceptance; H2, due to the presence of technical failures that reduce the perceived effectiveness; and H3, by lexical variation between profiles. These results support the literature (Davis, 1989; Venkatesh et al., 2003; Hassenzahl & Tractinsky, 2006) and extend its application to the context of public monitoring in Brazil.

Finally, in response to the research problem, it infers that assistants and monitors evaluate monitoring technologies differently. The former value attributes of simplicity and intuitiveness, confirming greater acceptance of KoboToolbox, while the latter highlight technical flaws, mainly associated with uMov.me, in addition to institutional concerns related to information security. Thus, the perception of usability is mediated by technical, design, and contextual factors, confirming that technological adoption in the MDS/DEPAD requires both investments in stability and design of tools and training adjusted to the profile of users, in line

with recommendations in the international literature on usability and digital governance (DeLone & McLean, 2003; Dawes et al., 2016; Lewis, 2018).

5 FINAL CONSIDERATIONS

The present study sought to understand how assistants and monitors perceive the usability and difficulties in the use of technologies applied to the monitoring of contracts of therapeutic entities linked to the MDS/DEPAD. The research problem stemmed from the need to assess the extent to which new digital platforms, such as KoboToolbox and uMov.me, are able to improve data collection and reliability in institutional supervision processes. The analysis, based on lexicometric methods, proved to be consistent and aligned with the literature that defends the application of textual analysis as a scientific validation strategy in the social sciences (Reinert, 1990; Camargo & Justo, 2013; Krippendorff, 2019).

The results confirmed **Hypothesis 1 (H1)** by showing that positive perceptions of usability are directly related to technological acceptance. KoboToolbox was associated with terms such as *intuitive*, *practical* and *good*, indicating that simplicity of interface is one of the factors most valued by users. This finding is in line with classical models of technology acceptance (Davis, 1989; Venkatesh et al., 2003) and reinforces research on the importance of design and clarity in user experience (Hassenzahl & Tractinsky, 2006). Thus, it was found that platforms perceived as facilitators of the work tend to achieve greater adherence in public monitoring contexts.

Hypothesis 2 (H2) was also validated, showing that technical difficulties reduce the perception of effectiveness of the systems. Terms such as *crash,* problem*,* and *failure*, often associated with uMov.me, indicated that performance barriers compromise users' confidence in the tool. This finding dialogues with studies by Hornbæk (2006) and DeLone and McLean (2003), who point to malfunctions as factors of technological rejection. In the context of monitoring therapeutic entity contracts, these limitations represent not only an operational obstacle, but also a threat to the quality and reliability of data collected in the field.

The analysis also confirmed **Hypothesis 3 (H3),** according to which the functional profile influences the perception of usability. While the assistants used a more evaluative vocabulary, highlighting positive or negative attributes of the tools, the monitors presented a technical discourse, centered on operational and information security issues. These findings are similar to studies that demonstrate how different user profiles shape their perceptions as a function of their institutional responsibilities (Zaharias & Poylymenakou, 2009; Holden & Karsh, 2010). Thus, it was evidenced that technological adoption in the MDS/DEPAD needs to consider the heterogeneity of functions and profiles to ensure effectiveness.

Hypothesis 4 (H4) was equally supported, confirming that the simplicity of the interface and the clarity of the interaction with the system increase the quality of the user experience. This evidence reinforces that technological adoption depends not only on the objective functionality of the system, but also on the subjective perception of ease of use (Tractinsky, Katz & Ikar, 2000; Sauro & Lewis, 2016). In this sense, the perceived superiority of KoboToolbox over uMov.me shows that the effectiveness of a platform is not restricted to technical performance, but includes design and user experience attributes, which can determine trust in the system.

In the theoretical field, this study contributes by applying lexicometric analysis to evaluate technological acceptance in a specific context of monitoring contracts of therapeutic entities. This approach allowed the identification of objective discursive patterns and reduced interpretative biases, which strengthens the scientific validity of the investigation (Krippendorff, 2019; Bardin, 2011). In addition, by articulating hypotheses derived from classical models of technological acceptance with empirical results obtained in Brazilian public policies, the research expanded the scope of the international literature and demonstrated the relevance of the triangulation between qualitative and quantitative methods in the study of usability.

From a practical point of view, the results offer subsidies for the formulation of strategies to improve public management. The evidence that assistants and monitors perceive the tools differently suggests the need for training programs differentiated by functional profile, ensuring that each group is trained according to its specific demands. In addition, the finding that technical failures compromise the reliability of data reinforces the importance of investments in technological stability and continuous support, in order to ensure that the systems fulfill their function of improving institutional monitoring and accountability.

It is important to recognize, however, some limitations of the study. The number of respondents, although sufficient for lexicometric analyses, restricts the statistical generalization of the results. In addition, the use of a textual corpus constructed from questionnaires may not fully capture the complexity of practical field experiences. Future research may explore mixed approaches, combining lexicometric methods with in-depth interviews and participant observation, in order to offer a more comprehensive view on technological adoption in public policies.

It is concluded that the research problem was answered clearly: assistants and monitors evaluate in a different way the usability of the technologies for monitoring contracts of therapeutic entities. While KoboToolbox's simplicity favors acceptance, uMov.me's

technical flaws limit its effectiveness. This heterogeneity of perceptions confirms the four hypotheses formulated and demonstrates that technological adoption in public policies depends on the interaction between technical, design, and contextual factors. Thus, the need to align training, technological stability and interface design with the specificities of the target audience is reinforced, ensuring that technological innovation is effectively transformed into efficiency and reliability gains in public management.

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