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DESIGNING TRUSTED HEALTH INFORMATION SPACES: THE CASE OF THE WINDOWS OF KNOWLEDGE

PROJETANDO ESPAÇOS CONFIÁVEIS DE INFORMAÇÃO EM SAÚDE: O CASO DAS JANELAS DO CONHECIMENTO

DISEÑANDO ESPACIOS CONFIABLES DE INFORMACIÓN EN SALUD: EL CASO DE LAS VENTANAS DEL CONOCIMIENTO

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Leonardo Adriano Ragacini[1]

ABSTRACT

In a context marked by an infodemic and the widespread circulation of low-quality content, digital curation becomes a central strategy for ensuring access to reliable health information. This chapter analyses the Windows of Knowledge (WoK) of BIREME/PAHO/WHO as a concrete example of a curation infrastructure implemented within the framework of the Virtual Health Library. Drawing on a literature review on digital curation, information lifecycle and preservation models, in combination with institutional technical documents, it examines the informational architecture of the Windows, their flows of content selection, validation and updating, as well as the technical and organisational requirements for their maintenance. Issues such as usability, accessibility, interoperability with other health platforms and the challenges of continuous updating in highly dynamic knowledge domains are discussed. A SWOT-type analysis explores the initiative's strengths and weaknesses, highlighting opportunities for expansion to new themes and audiences. Concrete examples, such as the Windows dedicated to COVID-19, Mpox, health promotion and the commercial dimension of the determinants of health, illustrate how digital curation can support public policies, health education and evidence-informed decision-making. Finally, the chapter proposes recommendations to strengthen similar initiatives in other institutional contexts.

Keywords: Digital Curation. Health Information. Infodemic. Virtual Health Library (VHL). Windows of Knowledge (BIREME/PAHO/WHO).

RESUMO

Em um contexto marcado por uma infodemia e pela ampla circulação de conteúdos de baixa qualidade, a curadoria digital torna-se uma estratégia central para garantir o acesso a informações confiáveis em saúde. Este capítulo analisa as Janelas do Conhecimento (WoK) da BIREME/OPAS/OMS como um exemplo concreto de infraestrutura de curadoria implementada no âmbito da Biblioteca Virtual em Saúde. Com base em uma revisão de literatura sobre curadoria digital, ciclo de vida da informação e modelos de preservação, combinada a documentos técnicos institucionais, examina-se a arquitetura informacional das Janelas, seus fluxos de seleção, validação e atualização de conteúdos, bem como os requisitos técnicos e organizacionais para sua manutenção. São discutidas questões como usabilidade, acessibilidade, interoperabilidade com outras plataformas de saúde e os desafios da atualização contínua em domínios de conhecimento altamente dinâmicos. Uma análise do tipo SWOT explora as forças e as fragilidades da iniciativa, destacando

[1] Professional Master's Degree in Information Management. Universidade de São Paulo/Escola de Comunicações e Artes. E-mail: lragacini@usp.br

oportunidades de expansão para novos temas e públicos. Exemplos concretos, como as Janelas dedicadas à COVID-19, Mpox, promoção da saúde e à dimensão comercial dos determinantes da saúde, ilustram como a curadoria digital pode apoiar políticas públicas, educação em saúde e a tomada de decisão informada por evidências. Por fim, o capítulo propõe recomendações para fortalecer iniciativas semelhantes em outros contextos institucionais.

Palavras-chave: Curadoria Digital. Informação em Saúde. Infodemia. Biblioteca Virtual em Saúde (BVS). Janelas do Conhecimento (BIREME/OPAS/OMS).

RESUMEN

En un contexto marcado por una infodemia y la amplia circulación de contenidos de baja calidad, la curaduría digital se convierte en una estrategia central para garantizar el acceso a información confiable en salud. Este capítulo analiza las Ventanas del Conocimiento (WoK) de BIREME/OPS/OMS como un ejemplo concreto de infraestructura de curaduría implementada en el marco de la Biblioteca Virtual en Salud. A partir de una revisión de la literatura sobre curaduría digital, ciclo de vida de la información y modelos de preservación, combinada con documentos técnicos institucionales, se examina la arquitectura informacional de las Ventanas, sus flujos de selección, validación y actualización de contenidos, así como los requisitos técnicos y organizativos necesarios para su mantenimiento. Se discuten aspectos como usabilidad, accesibilidad, interoperabilidad con otras plataformas de salud y los desafíos de la actualización continua en dominios de conocimiento altamente dinámicos. Un análisis de tipo FODA explora las fortalezas y debilidades de la iniciativa, destacando oportunidades de expansión hacia nuevos temas y públicos. Ejemplos concretos, como las Ventanas dedicadas a COVID-19, Mpox, promoción de la salud y a la dimensión comercial de los determinantes de la salud, ilustran cómo la curaduría digital puede apoyar las políticas públicas, la educación en salud y la toma de decisiones informada por evidencia. Finalmente, el capítulo propone recomendaciones para fortalecer iniciativas similares en otros contextos institucionales.

Palabras clave: Curaduría Digital. Información en Salud. Infodemia. Biblioteca Virtual en Salud (BVS). Ventanas del Conocimiento (BIREME/OPS/OMS).

1 INTRODUCTION

Information curation in healthcare is a crucial strategy for combating misinformation, especially given the escalating production and dissemination of unverified content. The explosion of digital data and the swift circulation of inaccurate information highlight the indispensable need for mechanisms that ensure access to reliable, evidence-based content. As Tredinnick (2006) argues, "the dematerialisation of information has reduced dissemination costs, but has also compromised the authenticity and traceability of content" (Tredinnick, 2006, p. 106). The democratisation of access to information necessitates effective strategies to minimise the impact of misinformation (Tredinnick, 2016).

Floridi (2013) observes that "ICTs have profoundly affected many aspects of the human condition, including the nature of communication, education, work, entertainment, industrial production and business, healthcare, social relations, and armed conflict" (Floridi, 2013, p. 17). Within the health sector, these changes carry critical implications, as misinformation can lead to misguided decisions, directly affecting public health and well-being (Vosoughi, Roy & Aral, 2018). Furthermore, Floridi (2013) stresses that "freedom of expression in the digital age must be balanced with the responsibility to avoid harm caused by intentional misinformation". The World Health Organisation (WHO) cautions that health misinformation represents one of the primary global threats, particularly during events like pandemics, where the spread of false news can undermine the effectiveness of preventative and therapeutic measures (WHO, 2021).

In this context, health information curation emerges as an essential practice to ensure that healthcare professionals, managers and the general public have access to trustworthy, evidence-based content. Wardle and Derakhshan (2017) highlight that content curation and digital curation are complementary processes involving the selection, organisation, preservation, and provision of information, aiming to add value and facilitate access to reliable data. UNESCO (2003), in its Charter on the Preservation of Digital Heritage, emphasises the necessity of preserving both born-digital data and digitised analogue sources. While content curation focuses on reducing informational noise through expert validation, ensuring information accuracy, digital curation extends this scope by managing digital assets throughout their lifecycle. This process includes data collection, preservation, and value enhancement for present and future use (Beagrie, 2008). In the realm of health information, these practices are fundamental for the efficient management of the vast volume of data generated in the sector, ensuring its accessibility, reliability, and long-term preservation.

Against this backdrop, the Windows of Knowledge (WoK) of the Latin American and Caribbean Centre on Health Sciences Information (BIREME) stands out as a structured tool designed to facilitate the organisation and provision of validated information, promoting qualified access to knowledge. The hypothesis of this study is that the WoK can be considered an efficient model for health information curation, playing a significant role in mitigating the effects of misinformation by delivering validated, systematically organised, and accessible content to diverse audiences. To test this hypothesis, a literature review was conducted in recognised databases, including PubMed, LILACS, and BRAPCI, using keywords such as "Digital curation", "Information curation", and "Digital libraries" in Portuguese and English. Additionally, technical documents from BIREME, such as the Windows of Knowledge: Customisation and Creation Guide (BIREME/PAHO/WHO, 2020), were consulted.

Tools like the Windows of Knowledge exemplify the practical application of digital curation, offering an organised and accessible platform for disseminating reliable health information, free of charge to the user (BIREME/PAHO/WHO, 2020). The WoKs are a strategic resource of the Virtual Health Library (VHL), specifically designed to highlight selected documents and information resources on pertinent topics. Functioning as a Knowledge Window, it draws attention to a representative collection of content, which may or may not be associated with a VHL Network Instance Portal. Following its own methodology, WoKs provide direct access to documents indexed in VHL information sources, alongside links to pre-defined search strategies, external sources, and content updated via RSS, such as blogs, epidemiological bulletins, and news. This approach ensures quick and reliable access to relevant information. Furthermore, content is delivered in a variety of formats, including videos, infographics, and infometrics, enhancing comprehension and usability for diverse audiences.

A study published in The Lancet highlighted that during the COVID-19 pandemic, over 80% of information shared on social media about the virus was inaccurate or false (Brennen et al., 2020). This scenario underscores the need for initiatives that promote the curation of reliable content, such as the WoK, which has already been used to highlight validated information on topics like universal health and infectious diseases (BIREME/PAHO/WHO, 2020). Moreover, WHO data indicates that health misinformation directly impacts adherence to treatments and vaccines. In 2019, for instance, vaccine hesitancy was deemed one of the

top ten global health threats, with misinformation being a primary contributing factor (WHO, 2019).

Given these challenges, digital curation in health information context is a vital strategy for promoting health education and combating misinformation. WoKs represent a crucial tool in this process, enabling the organisation and dissemination of validated scientific content, thereby contributing to evidence-based decision-making and the improvement of public health.

2 FOUNDATIONS OF DIGITAL INFORMATION CURATION

Information curation, particularly in the digital sphere, is a field demanding an interdisciplinary approach, integrating technical, theoretical, and practical aspects. According to Dallas (2015), digital curation extends beyond professional administration, encompassing a broad range of stakeholders including researchers, artists, users, and communities, as shared responsibility is vital for effective digital curation. Oliver and Harvey (2016) note the importance of "determining who the stakeholders in the curation process are, because each type of stakeholder is likely to have different knowledge, skills, and understandings about what the digital objects are and how they are used" (Harvey, 2016, p. 76). Tredinnick (2016) asserts that digital information curation must always strike a balance between the neutrality of knowledge organisation and the social responsibility of ensuring access to reliable information (Tredinnick, 2016, p. 224,).

Charles Esche points to inherent limitations and philosophical challenges within curatorial practice, particularly in artistic and cultural contexts (Martinon, 2013). Meanwhile, Harvey (2010) stresses the importance of a proactive approach, where data is planned and structured from its inception to guarantee its long-term utility. Tredinnick (2006) supports this notion, stating that "digital preservation is an essential aspect of information curation, ensuring the permanence of validated knowledge for future generations" (Tredinnick, 2016, p. 46). Floridi (2013) further reinforces this perspective, observing that "we will be in serious trouble if we do not take seriously the fact that we are building the new physical and intellectual environments that future generations will inhabit".

The Curation Lifecycle Model, developed by the Digital Curation Centre (DCC) – an institution dedicated to supporting and promoting digital curation – serves as a foundational approach, highlighting stages such as metadata creation. The principles underpinning this model include:

Holistic Approach: It considers the entire data lifecycle.

Focus on Preservation and Access: It ensures data remains useful and accessible.

Data Valorisation: It adds value to data for future reuse.

Collaboration: It involves various stakeholders in the process.

Adaptability: It can be applied across diverse contexts and disciplines.

Table 1 below summarises the main points of the DCC Curation Lifecycle Model:

Table 1

Main points of the DCC Curation Lifecycle Model

Category	Description
Full lifecycle actions	Apply to all stages of the lifecycle and are represented by four concentric rings in the model.
1. Description and representation information	Assign administrative, descriptive, technical, structural, and preservation metadata, using appropriate standards, to ensure adequate description and control over time. Collect and assign representation information.
2. Preservation planning	Plan preservation throughout the digital material's lifecycle, including plans for managing and administering all curation actions.
3. Community watch and participation	Monitor technological developments and participate in communities to ensure curation practices are up-to-date.
4. Curate and preserve	Perform management and administrative actions to promote curation and preservation throughout the lifecycle.
Sequential actions	Represent the main actions required to curate data as it moves through its lifecycle.
1. Conceptualise	Plan data creation, including defining preservation and reuse requirements.
2. Create or receive	Collect data and ensure it is properly structured and documented for preservation and reuse.
3. Appraise and select	Decide which data should be preserved based on criteria of value and utility.
4. Ingest	Add data to the repository, including assigning persistent identifiers, virus checking, and authenticity verification.
5. Preservation action	Apply preservation techniques, such as migration or emulation, to ensure data accessibility over time.
6. Store	Keep data in a secure and stable environment, with backups and multiple copies to ensure its integrity.
7. Access, use, and reuse	Ensure data is accessible and usable by authorised users, with metadata that facilitates its discovery and reuse.

8. Transform	Modify or reuse data to create new datasets, restarting the lifecycle.
Occasional actions	Actions that may be necessary under specific conditions, but do not apply to all data.
1. Reappraise	Re-evaluate data to determine if it is still relevant or should be discarded.
2. Dispose	Remove data that is no longer considered useful or relevant, following appropriate disposal policies.

Developed by the author based on Oliver and Harvey (2016, pp. 31-34)

According to Higgins (2008), the DCC Curation Lifecycle Model can serve as a valuable tool for planning curation and preservation activities in healthcare environments, ensuring the preservation and sharing of knowledge. This practical and methodological perspective is essential for addressing the technical challenges of digital curation, such as technological obsolescence and the fragility of digital objects. As the field evolves, there is a growing demand for professionals with specialised digital curation competencies, which can be particularly relevant for the effective management of health information in the digital age (Kim et al., 2013).

However, Martinon (2013) highlights Esche's view that curatorial practice is often constrained by external factors, such as financial and bureaucratic interests. He argues that while curation aspires to philosophical or aesthetic coherence, it is frequently compromised by the need to negotiate and manage these conflicting interests (Martinon, 2013, p. 24). This perspective from Esche underscores the tension between theory and practice in curation, a theme equally relevant in the context of digital curation. Both authors acknowledge the importance of reflection and critique in curation. Harvey (2010), for example, stresses the need to reflect on what curation truly means (Harvey, 2010). Both authors make a significant contribution to this discussion, as curation should not be viewed merely as an activity of organising exhibitions or events, but rather as an exploration of the potential for knowledge creation and critical reflection within this practice (Martinon, 2013, p. 241).

Another point of convergence between the authors is the significance of collaboration and knowledge sharing. Harvey (2010) highlights the necessity of a collaborative approach to digital curation, involving a variety of stakeholders, from scientists and researchers to librarians and archivists (Harvey, 2010, p. 93). Esche, in turn, suggests that curation should be a space for dialogue and exchange, where different perspectives and disciplines can converge (Martinon, 2013, p. 241). Despite these parallels, the authors also pinpoint distinct challenges. Harvey focuses on the technical and practical aspects of digital curation, such as

ensuring data accessibility and utility over time. He acknowledges that digital curation is an evolving field, where many practices and standards are still under development (Harvey, 2010, p. 55). This difference in emphasis reflects the multifaceted nature of the information curation process, as "digital curation not only organises information but assigns meaning and value to the knowledge generated" (Tredinnick, 2006, p. 184).

To facilitate understanding of the main concepts discussed by the authors, Table 2 below provides a structured overview of the practices, challenges, and theoretical perspectives related to information curation:

Table 2

Concepts of Curation (Harvey, 2010 and Martinon, 2013)

Concept	Definition/description	Example/practice	Challenges
Data lifecycle	The process encompassing data creation through to preservation and reuse.	Planning for "curation-ready" data from creation.	Ensuring data remains useful and accessible over time.
Metadata	Information describing data, including administrative and technical details, etc.	Creation of robust metadata to facilitate future discovery and use.	Maintaining consistency and utility of metadata across different contexts.
Digital preservation	Actions to keep data accessible beyond technological obsolescence.	Data migration to updated formats.	Dealing with rapid technological evolution and the fragility of digital formats.
Data reuse	Ensuring data can be effectively used in the future.	Open access policies and data sharing.	Balancing accessibility with privacy and copyright issues.
Collaboration and sharing	Joint work between different stakeholders to ensure effective curation.	Development of community standards and practices.	Coordinating efforts between disciplines and institutions with different priorities.
Critical reflection	Curation as an activity beyond mere organisation, exploring its potential for knowledge creation.	Questioning the limits of curation in bureaucratic contexts.	Overcoming financial and bureaucratic interests that restrict curatorial practice.
Risk management	Identifying and mitigating risks that threaten data integrity and accessibility.	Developing contingency plans for technological failures.	Anticipating and responding to unforeseen risks, such

			as natural disasters or hardware failures.
Curation as philosophical practice	Curation as a space for dialogue and reflection, not just organisation.	Exploring connections between science, art, and society.	Maintaining philosophical coherence in the face of external pressures, such as funding.
Access and authentication	Ensuring data is accessible only to authorised users.	Implementing access controls and authentication.	Balancing security with ease of access for legitimate users.
Data transformation	The process of adapting data for new uses or formats.	Data migration to new formats or creation of new datasets.	Maintaining data integrity and authenticity during transformation.

Developed by the author based on Harvey (2010) and Martinon (2013)

Information curation, especially in the digital context, is a complex field that demands a balanced approach between theory and practice. As highlighted in Table 1, curation involves a series of interconnected processes, from the data lifecycle to critical reflection on its role in knowledge creation. Harvey (2010) offers a practical and methodological perspective, emphasising the importance of practices such as creating robust metadata, digital preservation, and data reuse. These concepts are fundamental to understanding digital curation, which goes beyond simple data organisation, also encompassing risk management, data transformation, and ensuring access and authentication. However, the challenges are significant, including dealing with technological obsolescence, maintaining metadata consistency, balancing accessibility with privacy, and coordinating efforts across different disciplines and institutions.

Next, we will explore an analysis of the Windows of Knowledge (WoK) structure as a digital curation tool applied to the health sector. We will detail how the WoK was designed to organise and provide reliable and expert-validated information, facilitating quick and efficient access to relevant content.

3 ANALYSIS OF THE WINDOWS OF KNOWLEDGE STRUCTURE

The Windows of Knowledge (WoK) structure aims to highlight relevant and reliable information on specific health topics. It has been designed to facilitate quick and organised access to curated content, promoting the dissemination of expert-validated information. We will detail the WoKs structure, based on the customisation and creation guide

(BIREME/PAHO/WHO, 2020), highlighting its main areas, component layout, and the importance of expert collaboration in content curation.

The WoKs comprised of two main areas (Table 3): the component area and the content area. The component area is the initial section viewed by users and aims to draw attention to the topics covered through visual elements and quick links to supplementary information.

Table 3

Component Area of the Windows of Knowledge

Element	Description	Technical details	Recommendations
1.1 title	The title is the first element to be configured in the Knowledge Window. It should be clear, objective, and representative of the central theme.	Inserted into the WordPress editing field.	- short and direct title. - attract the target audience's attention. - facilitate navigation and content access.
1.2 main image	The main image is a central visual element, inserted via the WordPress post-thumbnail function.	Minimum dimensions: 320x320 pixels. Displayed in circular format in the Knowledge Window.	- choose clear images relevant to the theme. - ensure important content is visible in the circular format.
1.3 components	The Knowledge Window allows for the inclusion of up to 8 components, which are highlight boxes arranged around the main image. Each component is configured via a form with the following fields:		
1.3.1 public content	Defines whether the component will be displayed or hidden in the public interface.	Options: on (displayed) or off (hidden).	- use the off option for components under development or not intended for public display.
1.3.2 component title	A short and descriptive title for the component.	Recommended character limit: short and direct.	- clear and objective titles. - avoid long texts to improve readability.
1.3.3 text box	Optional area to include a small explanatory text about the component.	- simple text editor. - allows basic formatting.	- short and informative texts. - avoid overloading with unnecessary information.

1.3.4 link	Allows the insertion of URLS that direct to documents, pages, or specific sections of the site.	- internal or external links. - option to open in new window.	- use reliable and relevant links. - open in new window for external links.
1.3.5 title and icon colour	Visual customisation to highlight the component.	- selection of custom colours.	- choose colours that contrast with the background to improve visibility.
1.3.6 icon	Selection of icons from the Font Awesome library or insertion of custom images.	- pre-defined icons or URLS of images uploaded to the media area.	- choose icons that clearly represent the component's theme.
1.3.7 notes	Internal field for administrator annotations, not visible to the public.	- free text for internal use.	- use for annotations about the component's development or review.

Developed by the author based on the BIREME/PAHO/WHO Windows of Knowledge construction guide.

The components are arranged circularly around the main image, creating a visually appealing and functional layout. The order of components can be adjusted according to the relevance of the information, allowing for intuitive user navigation. This circular arrangement facilitates quick access to highlights, promoting an efficient and pleasant user experience.

The second area of the WoKs the content area, which permits the inclusion of detailed information about the topic addressed (Table 4). This area is divided into sections that can be configured according to content needs, using a simplified layout or WordPress's Page Builder for greater flexibility.

Table 4

Content Area of the Windows of Knowledge

Element	Description	Technical details	Recommendations
2.1 texts	the content area allows for the insertion of explanatory texts, which can be organised into one or two columns.	- WordPress text editor. - functionalities similar to a word processor.	- use headings and subheadings to organise content. - insert images to complement the text.
		- paragraph, heading, list formatting, and image insertion.	- customise background and text colours to improve readability.

2.2 infographics, images, charts, and tables	infographics and charts are powerful visual resources for transmitting complex information clearly and accessibly.	- insertion in up to three columns. - HTML codes for interactive infographics (e.g., Tableau).	- use clear and easily understandable infographics. - check compatibility with mobile devices.
		- some resources may not be compatible with mobile devices.	- avoid overloading the page with too many visual elements.
2.3 videos	the video area is compatible with platforms such as Youtube, allowing the insertion of up to three videos per section.	- insertion of video code (obtained from the Youtube url).	- choose short and relevant videos for the theme. - complement texts and infographics with videos.
		- multimedia functionality to enrich content.	- ensure videos are from reliable sources.
2.4 links to publications, documents, and related websites	the windows of knowledge allows for the inclusion of links to publications, documents, and websites related to the topic.	- organisation in up to three columns. - internal or external links.	- use reliable and relevant links. - direct to additional knowledge sources.
		- essential functionality to expand the reach of information.	- regularly check that links are functional and up-to-date.

Developed by the author based on the BIREME/PAHO/WHO Windows of Knowledge construction guide.

The content area is highly flexible, allowing for the organisation of texts, infographics, videos, and links into columns (1 to 3), depending on the topic's requirements. The column layout facilitates reading and navigation, ensuring that users find information quickly and intuitively. The combination of different formats (text, images, videos, and links) offers a multimedia experience, enriching the content and engaging the audience.

The arrangement of components and the organisation of content within the WoK have been designed to ensure an intuitive and efficient user experience. The component area, with its circular and visually appealing layout, draws attention to the key highlights of the topic. Conversely, the content area offers a flexible structure that can be adapted to meet the specific needs of each Knowledge Window.

Content curation in the WoKs a process involving the collaboration of specialists in the subject matter. These professionals are responsible for selecting, validating, and reviewing the information to be included in the Knowledge Window, ensuring that the content is accurate, up-to-date, and relevant. The participation of experts is fundamental to ensure the reliability of information, especially in critical areas like health, where misinformation can have severe impacts. Furthermore, peer review and content validation by qualified professionals enhance the WOK 's credibility, making it a reliable source of information for researchers, healthcare professionals, and the general public (Packer et al., 2014).

The WOK 's structure, with its component and content areas, has been designed to promote quick and reliable access to relevant health information. The visually appealing arrangement of components, combined with the flexibility of the content area, facilitates navigation and comprehension of the information. Moreover, the collaboration of experts in content curation and review ensures the accuracy and reliability of the information provided. This structure not only meets the needs of health information management but also positions itself as a strategic tool in combating misinformation, promoting the dissemination of validated and accessible knowledge.

4 WINDOWS OF KNOWLEDGE: STRUCTURE, IMPLEMENTATION AND TECHNICAL CHALLENGES

Implementing the WoK requires technical knowledge of WordPress and HTML (HyperText Markup Language), as the platform is built and managed within this environment. WordPress is a powerful tool, but its configuration and customisation demand familiarity with its interface, plugins, and functionalities. Additionally, Cascading Style Sheets (CSS) adjustments are frequently necessary to ensure a consistent and appealing design for the Knowledge Window.

Difficulty for inexperienced users: Healthcare professionals or content curators unfamiliar with WordPress or HTML may encounter difficulties in configuring and updating the Knowledge Window, relying on developers for basic tasks.

Reliance on technical support: A lack of in-house technical knowledge can lead to delays in implementing new functionalities or resolving issues, increasing dependence on third parties.

Additional costs: Hiring professionals specialising in WordPress and HTML can incur additional costs, particularly for institutions with limited resources.

The WoK requires constant updating to ensure that the information provided remains relevant and reliable. This involves periodic review of texts, replacement of outdated data, and inclusion of new resources, such as infographics, videos, and links.

- **Time and resource demands:** Maintaining an up-to-date Knowledge Window necessitates a dedicated team and an organised workflow, which can be challenging for institutions with limited human resources.
- **Risk of obsolescence:** If content is not regularly reviewed, the Knowledge Window may lose credibility, especially in dynamic areas like health, where new research and discoveries are frequent.
- **Impact on reliability:** Outdated information can lead to erroneous decisions by users, particularly in critical contexts such as public health.

The WOK must be compatible with mobile devices, such as smartphones and tablets, to ensure users can access information from anywhere. However, some features, like interactive infographics generated by tools such as Tableau, may not function correctly on mobile devices.

- **Compromised user experience:** If the Knowledge Window is not responsive or if some features do not work on mobile devices, users may struggle to access and interact with the content.
- **Loss of audience:** With the increasing use of mobile devices for internet access, a lack of compatibility can result in the loss of a significant audience.
- **Need for technical adjustments**: Ensuring compatibility with mobile devices requires testing and technical adjustments, which can increase the complexity and cost of platform maintenance.
- Technical maintenance of the WOKs essential to ensure continuous operation and data security. This includes regular updates to WordPress, plugins, and themes, as well as periodic backups.
- **Risk of vulnerabilities:** Outdated platforms can be targets for cyberattacks, compromising data security and the integrity of the Knowledge Window.
- **Time and resources for maintenance:** Technical maintenance demands dedicated time and resources, which can be challenging for small teams or those with multiple responsibilities.
- **Impact on availability:** Technical failures or security issues can result in periods of Knowledge Window downtime, hindering user access to information.

The WoK must be accessible to all users, including those with visual, auditory, or motor impairments. This necessitates the implementation of accessibility guidelines, such as the Web Content Accessibility Guidelines (WCAG), and conducting usability tests.

Complexity of implementation: Ensuring accessibility can require significant technical adjustments, such as including alternative descriptions for images and guaranteeing keyboard navigation.

Additional costs: Implementing accessibility features can generate additional costs, especially if it is necessary to hire digital accessibility specialists.

Impact on user experience: A platform that is not accessible can exclude part of the target audience, particularly in health contexts, where information is crucial for everyone.

The technical issues mentioned in Table 5 represent significant challenges for the implementation and maintenance of the WoK. These challenges have direct implications for the platform's effectiveness, user experience, and the reliability of the information provided. To overcome these obstacles, it is essential to invest in training, planning, and technical resources, as well as fostering collaboration among professionals from different areas. Addressing these technical problems will not only ensure the WoK 's success but also strengthen its role as an essential tool for disseminating reliable health information.

Table 5

Challenges for the Implementation of the Windows of Knowledge

Aspect	Description	Challenges	Considerations and solutions
5.1 technical knowledge	Implementing the windows of knowledge requires knowledge of WordPress and HTML to configure and customise the platform.	Difficulty for users without experience in WordPress or HTML. Need for CSS adjustments.	Offer training for teams. Rely on support from developers or IT professionals.
5.2 constant content updates	The relevance and reliability of information depend on constant content updates.	Keeping content updated requires time and resources. Risk of outdated information.	Establish a schedule for periodic review. Designate a team responsible for updating.
5.3 collaboration between professionals	The effectiveness of the Knowledge Window depends on collaboration between information professionals,	Difficulty coordinating between different areas of expertise.	Promote regular meetings between teams. Define clear roles and responsibilities.

	health specialists, and developers.	Communication between teams.	
5.4 accessibility and usability	The platform must be accessible and usable for different audiences, including people with disabilities and users with varying levels of technological familiarity.	Ensure accessibility for people with visual or motor disabilities. Intuitive interface.	Follow accessibility guidelines (e.g., WCAG). Conduct usability tests with different audiences.
5.5 mobile device compatibility	The Knowledge Window must be compatible with mobile devices, ensuring a consistent user experience across different platforms.	Some features, such as interactive infographics, may not work well on mobile devices.	Test the Knowledge Window on different devices and browsers. Prioritise the use of responsive features.
5.6 technical maintenance	Technical maintenance of the platform is essential to ensure continuous operation and data security.	Need for regular WordPress and plugin updates. Risk of security vulnerabilities.	Implement a regular technical maintenance plan. Perform periodic data backups.

Developed by the author based on the BIREME/PAHO/WHO Windows of Knowledge construction guide.

The Windows of Knowledge plays a vital role in disseminating reliable health information; however, its implementation and maintenance present challenges that require structured approaches to ensure efficiency and sustainability over time. To address these challenges, several fundamental strategies have been established, encompassing training and capacity building, continuous updating, interdisciplinary collaboration, usability and accessibility, and technical monitoring.

Staff training is one of the primary aspects to ensure that professionals responsible for the Knowledge Window are proficient in the tools used, such as WordPress and HTML, as well as possessing knowledge of information curation. Continuous training allows for technical and editorial adjustments to be made autonomously, reducing reliance on external support and ensuring greater agility in content updates. Additionally, team training should include best practices for information organisation, ensuring that data is presented clearly and accessibly to the target audience.

Constant content updates are a critical factor for the Knowledge Window's credibility. Defining a schedule for periodic reviews enables the maintenance of information relevance, ensuring that new scientific findings are incorporated and that links and references are regularly verified. This strategy prevents content obsolescence and strengthens user trust in

the platform. The implementation of this schedule should consider the update frequency of each topic covered, prioritising areas of greater impact and dynamism.

Interdisciplinary collaboration is another essential pillar for the WoK's success. Information professionals, health specialists, and developers must work in an integrated manner, ensuring that informational needs are met with adequate technical support. Clearly defining roles and responsibilities within the team contributes to a more efficient workflow and reduces communication barriers between different areas. Holding regular meetings to align strategies and share best practices is an effective approach to enhance this collaboration.

The usability and accessibility of the Knowledge Window are fundamental aspects for expanding its reach and ensuring that all audiences can use the platform intuitively and efficiently. Adopting international guidelines, such as the Web Content Accessibility Guidelines (WCAG), ensures that people with visual, auditory, or motor impairments can access information inclusively. Regular usability and accessibility tests should be conducted to identify and correct any barriers, ensuring fluid navigation and an optimised user experience.

Finally, continuous technical monitoring of the platform is essential to ensure its stability and security. Regular updates to WordPress, plugins, and themes are necessary to prevent vulnerabilities and potential malfunctions. Additionally, performing periodic backups protects data against loss and ensures rapid information recovery in case of failures. Performance monitoring is also a crucial strategy for identifying potential loading or navigation issues, allowing for proactive adjustments that improve the user experience. Implementing these strategies strengthens the WoK's reliability and sustainability, ensuring it continues to fulfil its role of providing quality information and combating misinformation in the health sector.

BIREME's WoK plays a role in health information curation, promoting access to reliable and evidence-based content. However, like any digital tool, it presents both positive aspects and challenges that can impact its effectiveness. Table 6 below summarises the main positive aspects and challenges faced by the WoK.

Table 6

Main positive aspects and challenges faced by the WoK

Aspect	Strengths	Challenges
Quality of information	Content validated by specialists and based on scientific evidence.	Need for continuous updating to avoid misinformation.

Usability	Intuitive interface and organised navigation.	Some functionalities require technical knowledge for configuration.
Accessibility	Available online and compatible with multiple platforms.	Not all content adheres to rigorous digital accessibility standards.
Interactivity	Use of videos, infographics, and links to reliable sources.	Some interactive functionalities are not optimised for mobile devices.
Updating	Possibility of continuous review through specialised curation.	Dependence on a qualified team to keep the platform always updated.
Visibility	Resource widely disseminated within the VHL and health information networks.	Low indexing in search engines can limit its reach.
Technical infrastructure	Based on WordPress, allowing customisation and scalability.	Requires constant maintenance to ensure security and stability.

Source: Developed by the author

Digital information curation requires a set of best practices to ensure the accessibility, preservation, and dissemination of knowledge. According to Harvey (2010), digital curation should follow well-established guidelines to ensure its effectiveness. Table 7 below presents which best practices are incorporated by the WoK and which need to be improved:

Table 7

Best practices incorporated by the WoK

Curation practice (Harvey, 2010)	Present in wok	Absent or to be improved
Curation planning from content creation	Yes	
Creation of structured metadata for better information retrieval	Yes	
Digital preservation to ensure content longevity	Partially	Lacks a robust long-term preservation plan.
Use of digital accessibility standards (WCAG)	Partially	Not all content strictly follows accessibility guidelines.
Continuous updating and validation by specialists	Yes	
Enhanced indexing for efficient information retrieval	Partially	Low indexing in search engines limits content reach.
Guarantee of interoperability with other health information platforms	Yes	
Strategies for user engagement with content curation	Partially	There could be greater interaction with the public for information customisation.

Source: Developed by the author based on Harvey (2010).

The table highlights that while the WoK adheres to several best curation practices, there are significant opportunities for improvement, particularly in digital preservation, accessibility, and information indexing. Investing in these aspects can ensure greater sustainability and efficiency in knowledge dissemination.

SWOT Analysis is a strategic tool used to evaluate the main internal and external factors impacting an organisation, project, or initiative. Its name derives from the words Strengths, Weaknesses, Opportunities, and Threats. This methodology provides a structured view of organisational reality, identifying internal strengths and weaknesses, as well as external opportunities and threats.

The application process primarily involves analysing internal factors, evaluating resources, capabilities, structure, and processes that confer a competitive advantage or represent challenges. Subsequently, the external environment is considered, identifying growth opportunities, technological advancements, political and economic changes, as well as potential threats that could compromise strategic objectives. The identified elements are organised into a matrix, facilitating the visualisation of interactions between strengths,

weaknesses, opportunities, and threats (Table 8). Based on this analysis, strategies are developed to leverage strengths, mitigate weaknesses, explore opportunities, and minimise external risks. The importance of SWOT analysis lies in its ability to guide strategic decision-making, offering a comprehensive view of the organisation and allowing the alignment of actions according to the internal and external context. In the case of the WoK, this tool can be essential for improving information curation, strengthening content reliability, and expanding its impact in combating misinformation, ensuring that its potential is maximised and its challenges are managed efficiently.

Table 8

SWOT Analysis

Strengths:	Opportunities:
Reliable and evidence-based content curation.	Expansion of the initiative to other health areas.
User-friendly interface and free access.	Greater collaboration among specialists for continuous review.
Use of multiple formats for information presentation.	Better indexing and dissemination on external platforms.
Weaknesses:	Threats:
Dependence on technical staff for updates and maintenance.	Risk of disseminating outdated information if curation is not continuous.
Some limitations in digital accessibility.	Dependence on digital infrastructure and technical support.
Interactive resources may present issues on mobile devices.	Competition with less reliable but broader-reaching information sources.

Source: Developed by the author.

Based on the SWOT analysis, several strategies can be implemented to strengthen the WoKs and mitigate the identified challenges:

- **optimisation of indexing:** Improve visibility in search engines, ensuring that WoKs reach a larger audience.
- **Continuous training**: Offer periodic training for librarians and content curators, ensuring continuous updating of the platform.
- **Reinforcement of accessibility:** Implement rigorous guidelines to make content more accessible, following international standards such as WCAG.
- **Digital preservation plan**: Create guidelines to ensure the maintenance and longevity of stored content.
- **User engagement:** Develop strategies for interaction and content personalisation to increase public participation.

- **Regular technical monitoring:** Establish a schedule for preventive maintenance to prevent platform failures and ensure stability.
- **Institutional partnerships:** Expand the network of specialists involved in content review and validation, strengthening the platform's credibility.

Adopting these strategies can significantly enhance the efficiency of the Windows of Knowledges, consolidating them as an essential tool for health information curation and combating misinformation.

5 WINDOWS OF KNOWLEDGE IN PRACTICE: PUBLIC HEALTH USE CASES

The Windows of Knowledge on the Natural History of COVID-19, launched in September 2021, exemplifies how scientific information can be organised and made available in an accessible and reliable manner. Developed in partnership between the Latin American and Caribbean Centre on Health Sciences Information (BIREME/PAHO/WHO) and the Brazilian Ministry of Health, the WoK provides a curated collection of scientific studies and updated data on COVID-19, organised by disease phases such as transmission, incubation period, antibody production, and cytokine storm (BIREME/PAHO/WHO, 2021).

The WoK distinguishes itself by providing evidence-based content, validated by specialists, and organised clearly and accessibly. Its structure allows information to be presented objectively, minimising ambiguities and facilitating public understanding. Furthermore, the use of multiple formats, such as explanatory texts, infographics, and videos, enables greater engagement, making access to knowledge more dynamic and appealing (BIREME/PAHO/WHO, 2021).

The application of the WoK in awareness campaigns is a practical example of its relevance. During the COVID-19 pandemic, the platform was used to disseminate accurate information on preventive measures, vaccine efficacy, and combating myths and misinformation about virus contagion. This model can be replicated in other health areas, promoting education on topics such as immunisation, mental health, and nutrition (BIREME/PAHO/WHO, 2021).

Alessandra Siqueira, director of the Ministry of Health's Department of Science and Technology, highlighted the importance of facilitated access to scientific information as a means of achieving the department's mission. Rosana Leite, the extraordinary secretary for COVID-19 response, also emphasised that solid evidence bases are "indispensable" for work in the health field (BIREME/PAHO/WHO, 2021).

Beyond its use in combating COVID-19 misinformation, the WoK has been applied in various other public health areas. The Windows of Knowledge on the Commercial Dimension of Social Determinants of Health (DCDSS), launched in November 2021, addresses how commercial practices can negatively impact health, particularly regarding the consumption of unhealthy products. This Knowledge Window was developed in collaboration with over 50 specialists and aims to support public policies that reduce the consumption of health-harming products (BIREME/PAHO/WHO, 2021).

Another relevant application is Windows of Knowledge on Health Promotion, launched in December 2023. This platform brings together institutional documents from 25 countries in Latin America and the Caribbean, offering updated resources for implementing health promotion strategies within the context of the Sustainable Development Goals (SDGs). The Knowledge Window includes materials on healthy municipalities, health-promoting schools, and healthy work environments, among other topics (BIREME/PAHO/WHO, 2023).

More recently, in September 2024, the Windows of Knowledge on Mpox was updated to provide current information on the global disease outbreak, declared a Public Health Emergency of International Concern (PHEIC) by the WHO. The platform offers clinical guidelines, treatment protocols, and resources for epidemiological surveillance, aiming to support a coordinated response to the outbreak (BIREME/PAHO/WHO, 2024).

These examples demonstrate the WoKs potential in various public health areas. From the launch of the Windows of Knowledge on the Natural History of COVID-19, which provided crucial information for pandemic response, to the Knowledge Window on the Commercial Dimension of Social Determinants of Health (DCDSS), which addressed the impacts of commercial practices on health, the platform has proven versatile and adaptable to emerging needs. Furthermore, the Knowledge Window on Health Promotion and the recent update of the Knowledge Window on Mpox reinforce the WoK 's role as a dynamic and up-to-date tool, capable of responding to global health challenges with agility and precision.

The WoKs importance extends beyond merely providing information. It acts as a facilitator for building evidence syntheses, supports informed public policy formulation, and promotes health education broadly and inclusively. By offering content in multiple formats, such as texts, infographics, and videos, the WoK reaches diverse audiences, from healthcare professionals and researchers to the general population, democratising access to scientific knowledge.

Collaboration between institutions such as BIREME/PAHO/WHO, the Brazilian Ministry of Health, and specialists from various fields has been fundamental to the WoKs success. This partnership not only ensures the quality and reliability of the information provided but also strengthens the network of technical cooperation in health, promoting the exchange of knowledge and experiences among countries and regions. Therefore, the Windows of Knowledge is not merely an information platform, but a transformative tool that contributes to building a more informed, healthy, and resilient society. Its continuous development and expansion are fundamental for addressing public health challenges.

6 CONCLUDING REMARKS

This research addressed the Windows of Knowledge (WoK) created by BIREME, aiming to evaluate its capacity as a digital curation tool in the health sector. The choice of topic is justified by the growing need for effective strategies to ensure access to reliable information, particularly in an infodemic scenario. The study allowed for an analysis of how the WoK fits into this context and contributes to the organisation and dissemination of validated information, promoting qualified access to knowledge.

The main objective of this research was to understand the WoKs structure and functionality, evaluate its effectiveness in digital curation, and identify challenges and possibilities for improvement. Throughout the analysis, it was possible to demonstrate that the WoK adheres to the principles of digital curation by selecting, organising, and providing relevant information for different audiences, but challenges such as the need for continuous updates and digital accessibility require greater attention. The methodology employed in the research included a literature review and the study of BIREME's technical guidelines, which allowed for mapping the main advances and challenges of the tool according to best practices as conceptualised in the literature on digital curation. The WoK was confirmed as an important tool in information organisation and access to reliable content, as it follows a significant portion of these information curation practice guidelines.

The initial hypothesis of the research was that the WoK could be considered an efficient model for digital health information curation, capable of minimising the impacts of misinformation. The results partially confirm this hypothesis: although the WoK exhibits fundamental qualities for digital curation according to the principles of this technique, there is a need for technical and operational enhancements. The implementation of stricter guidelines for accessibility and content updating can further strengthen its performance; however, its

importance is already evident when considering practical examples of its activity, such as the Windows of Knowledges on Health Promotion, Mpox, the Commercial Dimension of Social Determinants of Health, and the Natural History of COVID-19. The cited examples demonstrate how developing strategies to increase the visibility and engagement of the scientific community with the WoK can also contribute to its consolidation as a reference in digital curation.

We conclude that the WoK, as a strategic tool of BIREME, plays an essential role in this scenario and, with the necessary adaptations, has the potential to establish itself as a model of excellence in digital health information curation.

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