

International Journal of Human Sciences Research

ONLINE COMMUNITIES OF PRACTICE FOR THE DEVELOPMENT OF DIGITAL SKILLS

Robson Santos da Silva

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



Abstract. This article investigates the impact of using online Communities of Practice (CoP) for the development of digital competencies among indigenous health nurses. Utilizing thematic analysis of interactions, questionnaires, and discussion content within a CoP, the study is based on the research titled “Framework for the development of digital competencies for indigenous health nurses: Mukaturusá.” The results indicate that the CoP significantly promoted collaborative learning and the enhancement of digital competencies, demonstrating its effectiveness as an educational support for online and hybrid learning for health professionals, aligned with public policies on digital education in Brazil. **Keywords:** online communities of practice; digital competencies; digital education; framework; collaborative learning.

INTRODUCTION

The popularization of digital technologies since the second half of the 20th century has generated debates and initiatives, in several countries, related to the development of digital skills among their populations. In Brazil, according to Schuartz and Sarmiento (2020), initiatives by professionals, researchers, institutions and governments can also be identified with this objective, mainly from the perspective of education.

Currently, in the country, the highlights, for example, are Law number: 14,533, of January 11, 2023, which established the national Digital Education Policy; the significant increase in scientific publications on the topic; and the approaches of the National Common Curricular Base (BNCC) that recognize the implications of the digitalization of information and propose actions that equip individuals and societies for full citizenship in the face of new ways of working, communicating, establishing relationships and learning (BRASIL, 2017).

According to Pereira et.al (2019), to be considered digitally competent, a person must have knowledge, skills and attitudes that go beyond the simple use of these technologies. Ghomi and Redecker (2019) add to this perspective considerations that, in addition to enabling the critical and creative use of Information and Communication Technologies (ICT), digital skills are considered transversal because they permeate and support the development of other skills.

In this context, this article aims to present an objective contribution to this theme by analyzing an online community and practice (CoP) that, being integrated by nurses, enabled network learning through debates, exchange of experiences, generation, collection and processing of data. This is a CoP that, in addition to developing the participants’ digital skills, contributed decisively to the creation of a framework called Mukaturusá whose objective is to serve as a knowledge base for the development of distance, in-person or hybrid educational strategies and actions that aim to develop the skills of nurses who work in indigenous health.

CONTEXTUALIZATION

The scientific research that serves as the basis for this article is entitled Framework for developing digital skills for indigenous health nurses: Mukaturusá. Completed in 2023, it resulted in learning for its participants and in the structure whose bases are identified in the figure 1.

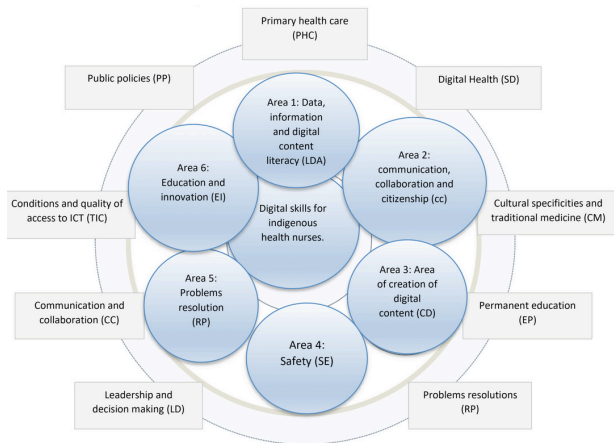


Figure 1 – Mukaturusá Framework

Source: Silva (2023).

In the external part of the framework, as presented in Table 1, there are the essential aspects that reference, support or condition the digital skills of nurses who work in indigenous health.

On the inside, the areas and the respective sets of skills that each one covers stand out, as seen in Figure 2.

The combination between the internal and external areas of the framework enables an integrated vision that includes the areas, competencies, proficiency levels and essential aspects that need to be taken into consideration for actions aimed at developing the digital skills of nurses who work in indigenous health.

It is observed that the Mukaturusá structure is in line with Jabbareen's (2009) perspective, according to which a framework is a network of interconnected concepts that provides comprehensive understanding of a phenomenon. Furthermore, according to Shehabuddeen et al. (1999), of a technology to communicate and promote cooperation for the development of ideas and discoveries; compare different situations and approaches, define domains and limits in a given context; present and argue about contexts; and contribute to the development of procedures, techniques, methods and technologies.

It must also be noted the conceptual understanding adopted in the research that:

Digital skills involve the confident, critical and responsible uptake and use of digital technologies in learning, working and participating in society. These include information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), security (including digital well-being and skills associated with cybersecurity), issues related to intellectual property, problem solving and critical thinking (VUORIKARI et al., 2022, p.3).

Considering the objective and professional category of the people who participated in the research, the concept of digital health must be observed.

Digital health has been changing the way health services are organized and offered around the world and Brazil is no exception. Health activities are closely linked to information and communication and depend on knowledge and technology to enable innovative, effective, effective and efficient mechanisms that expand the reach and increase the quality, solvability and humanization of the various aspects of health care. (CRUZ et al., 2022, p.65).

Finally, within the context of contextualization, it is important to highlight that nurses who work in indigenous health are considered to be professionals who work in indigenous areas developing Primary Health Care (PHC), that is:

set of individual, family and collective health actions that involve promotion, prevention, protection, diagnosis, treatment, rehabilitation, harm reduction, palliative care and health surveillance, developed through integrated care practices and qualified management, carried out with a team multidisciplinary and aimed at the population in a defined territory, for which the teams assume health responsibility. (Ministry of Health, article 2 of Ordinance Number: 2,436, of September 21, 2017).

Aspect	Description
Primary Health Care (APS)	Level of care consists of a set of individual, family and collective actions that involve promotion, prevention, protection, diagnosis, treatment and rehabilitation developed through integrated care practices and qualified management (BRASIL, 2017). At SasiSUS, PHC also includes referral and follow-up, when necessary, at medium and high complexity levels to continue treatment until individuals are safe and able to return to their homes in the villages.
Digital Health (SD)	According to Brasil (2022), it comprises the use of Information and Communication Technology (ICT) resources to produce and make reliable information about the health status available to citizens, health professionals and public managers through the incorporation of different technologies and concepts, including social networks, Internet of Things (IoT), Artificial Intelligence (AI), advanced computing, big data analytics, artificial intelligence, including machine learning and robotics (OMS, 2021, p. 11).
Cultural Specificities and Traditional Medicine (CM)	Relative to the cultural specificities of each of the 305 (three hundred and five) ethnicities served by SasiSUS, including 274 (two hundred and seventy-four) languages; access and relationship with the digitalization of information; and coexistence of traditional medicine which, according to WHO (2002), is a set of practices, approaches, knowledge and beliefs that incorporate medicines based on plants, animals, minerals, spiritual therapies and various techniques aimed at treating, diagnosing and preventing illnesses.
Permanent Education (EP)	Considered from the perspective of a transformative process in which, based on the effective needs of the work environment, SasiSUS users, including professionals, must undergo permanent training in order to enable the efficient and effective use of the Subsystem, enabling still conditions for innovation.
Problem solving (RP)	The dynamism with which events happen at SasiSUS requires readiness to constantly resolve challenges that constantly arise. In this context, even though digitalization has self-improvement mechanisms, professionals must be in a position to promote problem solving.
Leadership and Decision Making (LD)	Although not all nurses are in a leadership position, the ability to lead and make decisions is a factor that must be considered and promoted since these professionals' deal with life and this requires readiness for action.
Communication and Collaboration (CC)	The peculiarities of indigenous health work include cultural differences, large geographical distances, difficulties in accessing means of communication and complex logistics, these being factors that require high individual and collective capacity for the full development of communication and collaboration between professionals and with users.
Conditions and Quality of Access to ICT (TIC)	They refer to the institutional role aimed at providing conditions of access and the quality of technological means made available so that professionals can act and users can have access to health.
Public policy (PP)	SasiSUS has public policies specially designed for its planning, execution, evaluation and monitoring, and professionals, users and society must have conditions so that this entire cycle can be carried out with efficiency, effectiveness and quality.

Table 1: Mukaturusá: references, support and conditions

Source: Silva (2023).

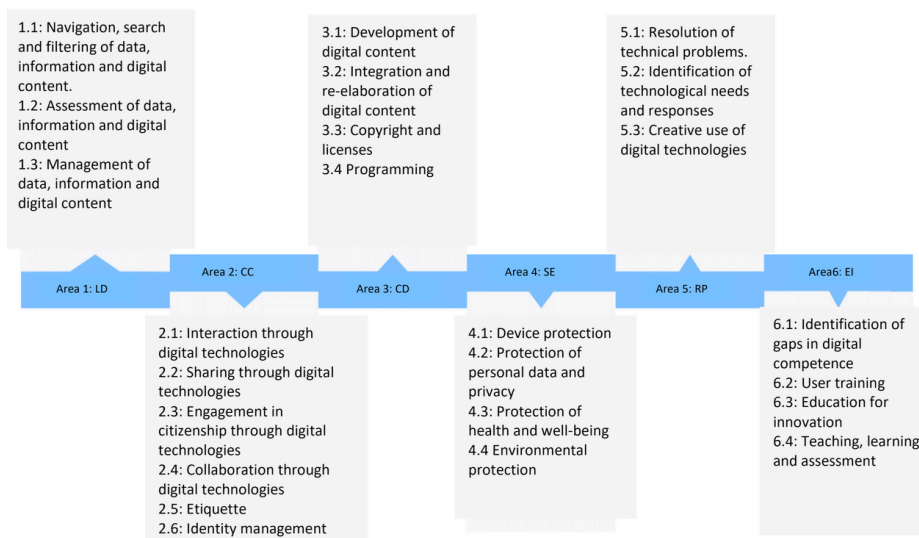


Figure 2 – Mukaturusá: areas and competencies

Source: Silva

Having established the context and the basic concepts that permeate it, it is observed that, in order to achieve the proposed objective, different procedures were adopted in the research that serves as the basis of this case study, including: ex- post facto, bibliographic and documentary research, field study; and instruments, with emphasis on the questionnaire, systematic and integrative searches, narrative review, Delphi panel and community of practice, which, in turn, constitutes the theme addressed in this case study.

COMMUNITY OF PRACTICE

Communities of practice (CoP), according to Wenger (2010; 1998), are interactive tools from which people with common objectives and interests on a given subject can obtain and share knowledge while enabling learning from a informal, dynamic social structure capable of contributing to the formation of a group identity. And, therefore, it was configured as an intermediate objective of this research.

According to Khosla (2009), what maintains the dynamism of CoP are the relationships established through the management and dissemination of information, with technology providing the means so that knowledge, experiences, practices and tools can be shared and learned. In turn, according to Pivetta et al. (2016), a CoP represents a space for collaboration and learning as long as conditions are provided for involvement, creativity and engagement.

In the CoP created for the research, a structure was considered that contemplated these spaces, including: platform, as a technology capable of providing and integrating tools; characterization of the community, since technologies must be compatible with the possibilities of the target audience; tools, to characterize the ways in which technologies are used with or

without the need for support or monitoring; and additional resources, considering tools already in use or new ones that can be adapted and integrated.

According to Wenger et al. (2005), the identification of how interaction occurs in virtual communities, including types of activities, actions necessary for the constitution of the community, and factors involved in individual and collective participation, can be carried out based on a representation in the form diagram presented in Figure 2.

Based on the different forms of interaction and technologies identified in the diagram by Wenger et al. (2005), the CoP created for the research (Figure 3) was hosted on an internet service provider and could be accessed by participants via the address <<https://competenciadigital.ning.com/>>, between December 2022 and February 2023.



How to participate:

This virtual space is structured to share the information and knowledge generated by this community of practice, whose theme is the development of digital skills for indigenous health nurses. Thus, participants have different tools at their disposal, including spaces for inserting and sharing articles, forums, videos, software and services, events, a chat room and access to a test to assess digital skills in a personal space.

Figure 3- Community of practice

Source: Silva (2022)

The CoP was structured with the following areas: articles, forums, videos, software and services, practice bank, events, chat, test to assess digital skills and my page (a private and individual space for each participant). By structuring the CoP with these resources, the aim was to enable interactivity and full interaction between participants. To this end, we started with the questions raised by Wenger et al. (2005) about the need to observe different aspects related to configuration, tools

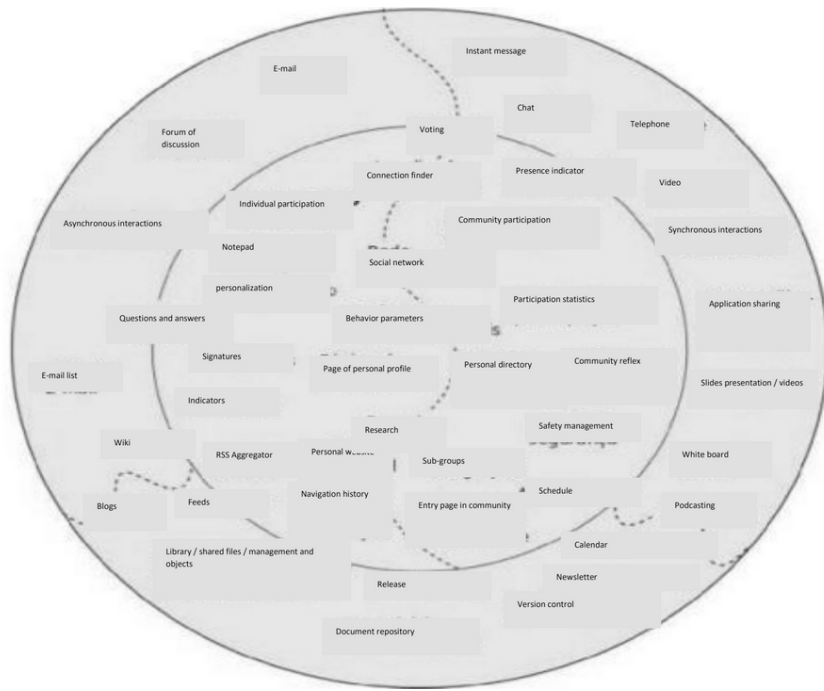


Figure 2- Interaction, publication and participation in CoP

Source: Wenger et al. (2005)

and characteristics, as seen in Table 1.

Setting	<ul style="list-style-type: none"> - What type of internet access is needed? -What technologies are already used by participants? -What are the levels of individual skills? -Do participants already use technology fully and comfortably? -Is there linguistic and cultural diversity? -Is there the possibility of forming subgroups?
Tools	<ul style="list-style-type: none"> - What types of interactions are there? -What is the nature of the events and meetings? -What is the need for asynchronous and synchronous interactions? -What and how to share information? -What actions are necessary to implement interactivity and interaction?
Features	<ul style="list-style-type: none"> - What are the characteristics, vulnerabilities and potential of the technologies? -How will they be implemented and used? At what time? -Are they adaptable and can be customized by participants or just by managers and technical staff?

Table 1 – Fundamentals of CoP Configuration

Source: Silva (2023), adapted from Wenger et al. (2005)

Based on this structure and configuration of the CoP, 34 (thirty-four) participants were invited, from 08 (eight) Districts, representing each Brazilian region in its proportionality when considering the size of the population served. Thus, there were: DSEI Alto Rio Juruá, Alto Rio Solimões, Amapá and Norte do Pará, Tapajós and Porto Velho representing the northern region; Cuiabá, mid-west region; Southern Interior, south-southeast region; and Alagoas and Sergipe, northeast region. In addition to national representation, the condition of the professional who was working in team coordination or who was responsible for issues related to training and development in health was observed. The objective of this action was to complement ex-post facto, bibliographic and documentary research and capture subsidies that would enable the identification and description of conceptual aspects, instruments, technologies and practices for the effective formulation of the framework.

When structuring the CoP, the concepts and assumptions obtained in the literature review were considered, including aspects related to education, health and existing frameworks. Besides, worth mentioning: Law number: 14,533, of January 11, 2023; and Law number: 14,510, of December 27, 2022.

a) Law number: 14,533, of January 11, 2023, which established the national Digital Education Policy (PNED). This is legislation that covers some important aspects for this research, including:

- Promotion of digital training and specialization; and research and development in ICT as structuring axes of the PNED;
- Promoting digital inclusion through the provision of online services for self-diagnosis and development of digital skills; access to digital resource repositories; and certification of proficiency in digital skills;
- Implementation of a national network to offer courses related to digital skills, within the scope of professional education and higher education;
- Digital qualification of public servants and employees, with the formulation of human resources management policy, aiming to combat the deficit of digital skills in public administration;

b) Law number: 14,510, of December 27, 2022, which authorizes and regulates the practice of telehealth;

Recognizes telehealth as the modality of providing health services at a distance, through the use of ICT and which involves, among others, the secure transmission of data and health information, through texts, sounds, images or other In appropriate ways, this legislation ratified the importance of digital skills for healthcare professionals, including nurses.

In addition to this legislation, ESD28 was also highlighted as it is the official document that guides the development of digital health in Brazil based on 07 (seven) priorities, of which 05 (five) are directly related to the level proficiency of professionals' digital skills: support for improving healthcare; user as protagonist; training and training of human resources; interconnectivity environment; and innovation ecosystem.

In order to compile the knowledge generated and shared in the CoP, at the same time as subsidies were collected to validate the framework that was being structured, the Delphi Panel was used. According to Powell (2003), it is an instrument that enables recognition, verification and combination of individual opinions, helping to resolve disagreements or improve incomplete states of the art. Corroborating this position, Linstone and Turoff (2022, p.3) state that the Delphi panel is a method that enables the structuring of collective communication, as it allows a group of individuals to address complex problems jointly through dialogue and consensus.

According to Gupta and Clarke (1996), the objective of Delphi is not to obtain a single answer, but rather to obtain as many quality answers as possible to support priorities and decisions. For Yousuf (2007), the use of the panel will depend on the objective to be achieved and can be classified into 03 (three) types: conventional, normative and policy Delphi. The conventional seeks opinion on a subject considering some type of prediction; the normative focuses on structuring and projecting a given subject considering existing needs; and the policy Delphi works with opposing opinions on a given subject so that, instead of consensus, the focus is on divergent opinions. Thus, in the specific case of this work, it was a normative panel.

According to Marques and Freitas (2018), despite the differences, the 03 (three) types of Delphi have common characteristics that distinguish them from other techniques: anonymity; feedback to participants on individual contributions; presentation

of the answers obtained to all group members; and possibility of reviewing and modifying responses. In addition to these characteristics, they point out that, to implement the Delphi panel, the following steps must be observed: choosing the group of experts; construction of the first questionnaire, qualitative and quantitative analysis of the responses; construction and sending of the second questionnaire with feedback on the answers already obtained; receipt and analysis of responses to the second questionnaire; and implementation of new rounds, if applicable; end of the process and production of the final report. In this work, the 34 (thirty-four) experts who participated in the Delphi panel also participated in the CoP.

LESSONS LEARNED

The CoP and the application of the Delphi Panel made it possible to obtain nurses' critical views on digital skills for nurses in the Mukaturusá formulation process. This way, there was the possibility of consolidating the bases of the framework based on the convergence between the contributions of professionals and the essential aspects that reference, support or condition work in indigenous health, including: public policies; Primary Health Care; digital health; conditions and quality of access to information and communication technologies; cultural specificities and traditional medicine; leadership and decision making; communication and collaboration; Permanent Education; and problem solving.

The community of practice made it possible, at the same time that professionals contributed to the structuring of the framework, there was the possibility of developing their respective digital skills through the collaborative construction of knowledge, active participation, and promotion of the exchange of experiences and ideas.

Critical reflection was also observed with a view to fostering an environment in which the analysis of experiences and the identification of opportunities for improvement were considered. Furthermore, the CoP presented itself as a very promising means for continuous professional development, which, if correctly conducted, can provide continuous updates on subjects within the scope of digital skills.

The adoption of the community of practice also presented itself as an instrument capable of enabling learning advances by stimulating reflection, active search and critical thinking based on innovation and solving problems that challenge professionals in their daily lives.

Ethics and social responsibility were also identified as the care and impacts that digital skills have on the personal and professional lives of these nurses were discussed.

CONCLUSION

The implementation of the community of practice (CoP) for the development of digital skills among indigenous health nurses, as reported in this case study, stands out as a pioneering and highly valuable initiative. Through the structuring and use of the CoP, it was possible not only to foster the development of critical digital skills, but also to contribute significantly to the formulation of the Mukaturusá framework. This framework serves as an essential knowledge base for developing educational strategies, both online and hybrid, aimed at improving these skills among nurses.

The uniqueness of this case lies in its holistic and collaborative approach, which not only encompassed the acquisition of digital skills, but also promoted enriching network learning, through debates, exchanges of experiences, and the generation, collection, and processing of relevant data. The success of this project reflects the importance of communities of practice as interactive and dynamic tools for ongoing

professional development and innovation in the healthcare field.

Furthermore, the CoP has proven to be an effective means of addressing specific Indigenous health challenges, integrating traditional and modern knowledge in a respectful and productive manner. The adoption of digital technologies, within this context, has not only expanded access to information and educational resources, but also strengthened nurses' ability to act more effectively and innovatively in their practices.

This case study highlights the transformative potential of communities of practice in developing digital skills in specific contexts, such as indigenous health. The Mukaturusá framework emerges as a replicable and adaptable model, offering valuable insights for the implementation of similar initiatives in other areas of health and education, reinforcing the importance of integration between technology, education and professional practice to face contemporary challenges.

REFERENCES

- CRUZ, T. P. F.; SILVA, A. B.; LOPES, P. R.; PISA, I. T. **Brazilian Digital Health Index (BDHI): avaliação da maturidade da saúde digital do Brasil**. *Journal of Health Informatics*, 2022.
- GHOMI, M.; REDECKER, C. **Digital Competence of Educators (DigCompEdu): Development and Evaluation of a Self-assessment Instrument for Teachers' Digital Competence**. 11th International Conference on Computer Supported Education, 2019.
- GUPTA, U. G., & CLARKE, R. E. (1996). **Theory and application of the Delphi technique: a bibliography (1975-1994)**. *Technological Forecasting and Social Change*, 53, 185-211.
- JABAREEN, Y. **Building a conceptual framework: philosophy, definitions, and procedure**. *International journal of qualitative methods*, SAGE Publications Sage CA: Los Angeles, CA, v. 8, n. 4, p. 49-62, 2009.
- KHOSLA, R. **Index evaluations and business strategies on communities of practice**. *Expert Systems with Applications*, v. 36, n. 2, p. 1549-1558, 2009.
- LINSTONE, H. A., & TUROFF, M. (2002). **The Delphi method: Techniques and applications**. Addison Wesley Newark, NJ: New Jersey Institute of Technology
- MARQUES, J. B.; FREITAS, D. **Método DELPHI: caracterização e potencialidades na pesquisa em Educação**. São Paulo: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), 2018.
- PEREIRA, N.; FERENHOF, H.; SPANHOL, F. **Estrategias para la gestión de las competencias digitales en Educación Superior: una revisión en la literatura**. *Revista Latinoamericana De Tecnología Educativa - RELATEC*, 2019.
- POWELL, C. **The Delphi technique: myths and realities**. *Journal of Advanced Nursing*, 41(4), 376-382, 2003.
- SCHUARTZ, A.; SARMENTO, H. **Tecnologias digitais de informação e comunicação (TIC) e processo de ensino**. *Revista Katálysis [online]*. 2020, v. 23, n. 03. Disponível em: <<https://doi.org/10.1590/1982-02592020v23n3p429>>. Acesso em: 06 jul. 2022.
- SHEHABUDEEN, N.; PROBERT, D.; PHAAL, R.; PLATTS, K. (1999). **Representing and approaching complex management issues: part 1 - role and definition [Working Paper N° CTM2000/03]**. Centre for Technology Management Working Paper Series Cambridge, 1-20.
- SILVA, R.S. **Framework para desenvolvimento de competências digitais de enfermeiros da saúde indígena: Mukaturusá**. 2023. Tese (Doutorado). Universidade Federal de Santa Catarina, Florianópolis, 2023.
- VUORIKARI, R., KLUZER, S. and PUNIE, Y. **DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes**, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022.
- YOUSUF, M. I. (2007). **Using experts' opinions through Delphi technique**. *Practical Assessment, Research & Evaluation*, 12(4), 1-9.
- WENGER, E. **Communities of practice: learning, meaning, and identity**. New York: Cambridge University Press, 1998.
- _____. **Communities of Practice and Social Learning Systems: the Career of a Concept**. 2010. London: Springer London: 179-198. ISBN 978-1-84996-132-5. Consultado em 3 de agosto de 2022.