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Teresa Margarida Loureiro Cardoso, João Paulo Pinto & Filomena Pestana

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## Networked research and open science: the WEIWER<sup>®</sup> experience

Teresa Margarida Loureiro Cardoso <sup>a</sup>, João Paulo Pinto <sup>b</sup>  
and Filomena Pestana <sup>b</sup>

<sup>a</sup>Universidade Aberta (Open University Portugal); Rede Académica Internacional WEIWER<sup>®</sup>, LE@D, Universidade Aberta, Lisbon, Portugal; <sup>b</sup>Rede Académica Internacional WEIWER<sup>®</sup>, LE@D, Universidade Aberta, Lisbon, Portugal

### ABSTRACT



This text addresses the importance of scientific collaboration networks in the context of open science, presenting the experience achieved within the International Academic Network WEIWER<sup>®</sup>. From this particular case, it will be possible to show that scientific entrepreneurship initiatives, based on collaborative research, are an effective way to overcome the individualism still present in many university institutions, e.g. due to their traditional or conventional features. Therefore, we aim to reflect on the contribution of these research networks to the policies that sustain the production and dissemination of scientific knowledge. In a current situation, in which there is a consolidation of the culture of openness, both at the governmental and academic levels, the WEIWER<sup>®</sup> experience allows us to conclude that networked research enables the construction of an open, collaborative and social space for science, respecting the autonomy, reflection and independence of each researcher. In short, we argue that in the context of open science, these research networks contribute to promote the construction of knowledge in collective settings, creating enriching dialogues and understandings on the complexity of both the research objects and designs dealt with.

### KEYWORDS

Networked research; open science; WEIWER<sup>®</sup>

## 1. Introduction

In today's scientific society, open science presents itself as "an umbrella concept, which encompasses different meanings, types of practices and initiatives, as well as different perspectives, assumptions and implications" (Albagli, 2015). It includes the research results, freely available, in open access, as well as the appreciation and direct participation of non-scientists, that is, citizens with different experiences and backgrounds, in different areas, evoking

**CONTACT** Teresa Margarida Loureiro Cardoso  [teresa.cardoso@uab.pt](mailto:teresa.cardoso@uab.pt)  Universidade Aberta, Delegação Regional de Coimbra Rua Alexandre Herculano, 52, Coimbra 3000-019, Portugal

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characteristics closely associated to citizen science. Today, we can find a true movement of international scope in favor of open science, based on the assumption that the dominant *modi operandi* in the policies that support scientific production and communication are no longer adequate, since they still convey different types of constraints, namely legal and economic, making its access and free circulation difficult, consequently conditioning the advancement and dissemination of scientific knowledge. Therefore, with regard to our theoretical framework, we consider concepts related to the open science movement, which is based on the principle that scientific research must be shared and reused, upon new ways of sharing knowledge. Open science is commonly associated with open access and the reuse of scientific research results, but also with the transparency of the processes, methods and practices involved to facilitate scientific collaboration, such as the recording of experiences, the development of software code, the use of technologies and the provision of digital network infrastructures. It is, above all, the way in which research is carried out, disseminated, implemented and transformed, using digital tools, networks and media, allowing, in short, to make the scientific process more efficient, transparent and effective.

Open science is, thus, an important field for scientific cooperation networks to assert their potential. It has evolved and is no longer limited to the online access of scientific journals; currently, it advocates for the encouragement of collaborative work, so that the production of knowledge is more global, faster and more effective, with lower costs. Hence, the sharing of information and experiences is essential to speed up and maximize the advances of science, avoid redundant work, facilitate the replication of methodologies, and also to help researchers come together and work on common projects; researchers sharing similar motivations and interests, but separated by geographic distance, integrating them and providing for openness and the sharing of knowledge. Thus, it is important to remember that networks are usually built to relate people with equivalent levels of abilities, skills, competences and experiences, who, by adding their efforts together, can achieve better results than those attained if they worked individually. It is in this context that the WEIWER® (International Academic Network WEIWER®

- Wikis, *Educação & Investigação* | Wikis, Education & Research) (WEIWER® Homepage, 2022) emerges, as space amongst researchers, for them to meet, reflect, share and work on Wikis in the context of open education.

The notion of Wiki is a concept widely used in the context of the internet and the web, to refer to platforms in which its contents can be edited online by multiple users. With the evolution of technologies and, in particular, of educational pedagogies, Wiki has become synonymous of collaborative networking and online work. One of the examples of its use on a large scale is the well-known online encyclopedia Wikipedia, elected as the central object of study of the WEIWER®; the goals of this research network “emerged from the need to (in)

form different audiences, mainly educational actors” (Cardoso, 2022), about the potential of Wikis, particularly within the projects of Wikimedia Foundation, and specifically Wikipedia, with regard to training, research and education contexts, in this case, in different levels of education.

Officially, the WEIWER<sup>®</sup> was established at the Laboratory of Distance Education and Elearning (LE@D) of the *Universidade Aberta* (Open University Portugal) in 2018, as a result of the academic and scientific work of researchers from this research unit, which is funded by Portuguese national funds through FCT – *Fundação para a Ciência e a Tecnologia*, I.P., the Portuguese national funding agency for science, research and technology, within the scope of the projects UIDB/04372/2020 and UIDP/04372/2020.

All the WEIWER<sup>®</sup> team members collaborate, working in common research interests and themes, set by both national and international research agendas, developing studies and projects that aim to meet local needs, albeit also outlined at a global level. It has periodically sought to carry out activities of a different nature, including training for different target audiences, such as students and teachers of primary and secondary education, and students and teachers of higher education. In addition to training, the WEIWER<sup>®</sup> team has promoted and participated in scientific events, with different extents and scopes, as well as submitted papers to scientific peer reviewed publications. It is also worth mentioning the dissemination of the network, namely of the results of the research carried out, in various *fora* and communities, fulfilling the spirit of open science.

Bearing in mind this introductory framing, in the next sections of this text, we intend to evidence that the collaborative work advocated by research developed in networks, in a word, the networked research, acquires relevance in the context of open science, as is the case of the International Academic Network WEIWER<sup>®</sup>, consolidating itself as an important formative and collective practice.

## 2. Networked research and open science

The movement for open science must be thought of in the context of social movements that emerge from changes in the conditions of production and circulation of information and knowledge. For Sarita Albagli, it is about “reflecting on the challenges that these changes bring to scientific dynamics” (Albagli, 2015), values and practices. According to the author, open science should be understood as a process, a procedure under construction, which mobilizes different (and, in some aspects, antagonistic) interests and points of view, and which also allows for multiple (and sometimes conflicting) interpretations.

In academia and science, it is common to associate open science to the processes that involve the sharing of research plans, designs and/or methodologies, as well as the sharing of data collected and publications too, but also new forms of international scientific collaboration (Chan et al., 2015), made possible

by new internet-based technologies. In fact, authors such as Michael Nielsen argue that “scientific knowledge of all kinds should be shared openly as soon as possible in the discovery process” (Nielsen, 2011), making the research process more transparent and facilitating access to intermediate data and not only to the final product. Thus, we highlight, of the definition that the British Research Information Network suggested for open science, the fact that it is a “science developed and communicated in a way that allows others to contribute, collaborate and add value to research efforts, with all types of data, results and protocols freely available at different stages of the process” (DiGiorgio, 2022).

If, traditionally, researchers only made available to the public what they considered to be a final product, now, following the open science principles, the scientific sharing of ongoing research goes beyond the common publication of articles, extending to other data, for instance software codes, protocols, processes and workflows, in such a way that people are free to use, reuse and distribute them without legal, social or technological restrictions (Chan et al., 2015). Recently, according to Kieron O’Hara and Wendy Hall, in some cases, open science also provides openness to the entire research process, covering the “definition of your work plan, from data generation and analysis to dissemination and reuse, with the help of various social platforms and tools” (O’Hara & Hall, 2013) associated with the internet to enable greater collaboration. This is a cooperation between different researchers (representing different activities, actions and strategies) that is driven, often, by different motivations, incentives, assumptions and objectives.

Accordingly, the understanding of open science must go beyond the access and reuse of knowledge, meaning it should value the collaboration and participation of several researchers, as said representing a variety of institutional contexts, with the most varied motivations and intentions, “operating within a socio-technical system” (Halford et al., 2013), both locally and globally. Thus, open science is also assumed to be collaborative, when it proposes to operationalize a research network in which the central quality is collaboration and participation. However, doing research within the collective settings implies intellectual humility in addition to the ability to dialogue and develop tolerance, to listen and respect the researchers involved, to face and accept different positions, to develop critical thinking with regard to the themes under work (Saul, 2016). Moreover, as Leslie Chan and collaborators point, open and collaborative science can “increase the visibility and impact of researches, facilitate the participation of researchers in local and international collaborations, stimulate public engagement with science and promote the culture of knowledge sharing” (Chan et al., 2015).

Given this framework, we underline another important attribute of open science, which is the relational principle (Magalhães et al., 2022), because collaborative research can generate the opportunity to create and consolidate various benefits of a networked association of people.

These networks, of a scientific nature, are usually built to keep together people, as previously mentioned, with similar levels of skills and experience, people who, by adding their efforts together, can achieve better results than those attained if they were doing work on their own, individually. So, these networks are one of the most favorable ways to cater for a space conducive to the collective and cooperative construction of knowledge.

Chronologically, and in general, one of the fundamental characteristics of science is that the results of researches are made public to allow the construction and dissemination of knowledge. In fact, the advancement of scientific knowledge largely depends on access to the contributions of previous researchers, with scientific publications, indeed assuming an essential role in dissemination. However, the dominance of commercial publishers, and the “obsession with intellectual property” (Albagli, 2015), has hindered access to such publications due to the inherent financial costs, making access to science less public (i.e., less open, less transparent). Faced with the exponential rise in the prices of scientific publications and the imposition of restrictive licenses for access and use of digital resources, policies for the application of the principles of open science have prioritized ensuring free access to publications and resources, as a way of combating commodification of knowledge and information.

The emergence of the internet has brought new opportunities to the scientific communication, namely the dissemination of knowledge. The scientific community now has the possibility to share their work for free, contributing to the advancement of knowledge production. Thus, web tools and networks allowed the emergence of opening movements in several domains (Cardoso, 2022), such as open access, open educational resources and open data initiatives, among others. This context of openness has influenced the practice of many university and higher education institutions, conveying an incentive to several projects of scientific entrepreneurship, of inclusive participation and collaboration, in a vision of innovation in scientific production and dissemination of knowledge.

Sarita Albagli considers that the movement for open science is, thus, part of a “frame of tension between, on the one hand, new forms of collaborative, interactive and shared production of information and knowledge. And, on the other hand, mechanisms for capturing and privatizing this knowledge that is collectively and socially produced” (Albagli, 2015). The author also notes that it has been demonstrated that it is in sharing and opening up to collective, rather than individual production, that creativity and innovation are best developed. The development and democratization of digital platforms, cyberculture and participatory culture have boosted new ways of producing and sharing information, and knowledge in science, allowing new practices of scientific networking to be supported, as is the case of the

WEIWER® research network, of which its experience is referred to in the next paragraphs.

### 3. The WEIWER® experience

In order to better share the experience of working in the WEIWER® research network, we start by further present it. The WEIWER® research network integrates researchers with scientific training in several areas, with a focus on education, collaborating around common interests and themes. Besides, and as already acknowledged, since the formalization of its inception, it has periodically sought to carry out activities of a different nature, including training for different target audiences, from students and teachers of primary and secondary education to students and teachers of higher education.

Hence, the International Academic Network WEIWER® emerges from the chief research problem that is stated in the following question: “Can wikis, namely Wikipedia, also be resources in education, training and research contexts?” (Cardoso, 2022). The ultimate purpose of the WEIWER® research network is, therefore, to promote research in the field of education and training with Wikis, namely Wikipedia (Cardoso & Pestana, 2022; Pestana & Cardoso, 2022). Thus, the purposes of diagnosing, planning, implementing and evaluating open educational practices, specifically with Wikipedia, in different education and training scenarios, are defined; to these objectives is added the goal of disseminating the results of the WEIWER® research studies, in a perspective of transferring knowledge and socially valuing it, which includes the development of solutions, in response to social challenges (Cardoso et al., 2021).

In fact, the genesis of the WEIWER® can be traced in the challenges that science faces in today’s society. A globalized society, with sociocultural implications that integrate the so-called new digital technologies, the backbone of the networked society (Castells, 2007) and drivers of a new social morphology, which is substantially altering production processes (operation and results) and the experience of power and culture (Cardoso et al., 2020). In this context, we consider that the concept of cyberculture (Lévy, 1999), proposed by Pierre Levy as a set of techniques that integrate both material and intellectual techniques, to which practices, attitudes, ways of thinking and values are added, is fundamental to understand this culture and social phenomenon. For this author, the establishment of links in a network of virtual communities based on affinities, interests and common objectives gives rise to collective intelligence, a globally distributed intelligence, constantly valued in real time and that leads to the mobilization of competences.

It is in this field of action that the International Academic Network WEIWER® has been operating, stemming from the result the work of several researchers, at the LE@D, one of the research units hosted by the Open University Portugal;

that work, of over a decade now, assuming Wikipedia as one of the primary objects of study, includes, for example, Master's degrees dissertations, doctoral theses, post-doctoral reports, papers in scientific journals, and book chapters.

Evoking once more the genesis of the WEIWER®, formally, its officialization dates back to 2018, when its first Open Sessions were held, with the aim of creating synergies between the different educational actors, namely teachers and students (Cardoso et al., 2019). These events, aligned with the LE@D research agenda, also seek to meet the Portuguese national strategy with regard to the digital skills, which is being implemented through the Portugal INCoDe. 2030 Initiative by the Portuguese government (INCoDe, 2030).

Furthermore, specific areas of the European Framework of Digital Competence for Educators are addressed, specifically Areas 2 and 6. From the Area 2, dedicated to the digital resources, we explicitly target at the component associated with research, development and editing of those digital resources; in the context of open educational resources, we explicitly target at issues associated with open licenses, as they should be considered at the same time. From the Area 6, aimed at learners, our focus is set specifically on the copyright and the role that the open licenses assume, among the various proposals within the scope of promoting digital skills for that particular audience (learners). Moreover, our focus is set on the ability of learners to identify the criteria associated to the open licenses, so they become competent in identifying their level of use and application with regard to the open licenses (Lucas & Moreira, 2018).

As far as the international references are concerned, the WEIWER® research and studies are aligned with the United Nations (UN) 2030 Agenda for Sustainable Development, through its Sustainable Development Goals (SDGs), namely SDG 4 – Quality Education, as a warrant to ensure access to inclusive, quality and equitable education, and promote lifelong learning opportunities for all (The United Nation Sustainable Development Goals Homepage, 2022). By promoting and creating conditions for the achievement of this SDG 4, we are certainly promoting other SDGs, of which we highlight, due to their centrality in the organizational structure of the network, SDG 5 – Gender Equality, and SDG 17 – Partnerships for the objectives. In fact, these SDGs reflect commitments to ethics, global citizenship and natural and cultural diversity, also present in the mission of the Wikipedia, which we assume as central to the sustainable development, both for people and for institutions.

The pursuit of the UN 2030 Agenda, explicitly included in the work strategy of the WEIWER® research network, allowed us to submit our project to the WSIS Prizes 2020 competition (The WSIS Prizes, 2020), in which it was distinguished as Champion Project in the E-Science category. As a result, we were invited to participate in the World Summit on the Information Society Forum (WSISF) that year. The WSISF is an annual event, held in Switzerland and coordinated by several organizations related to the United Nations (such as, among others, the International Telecommunication Union, ITU, “the United Nations

specialized agency for information and communication technologies – ICTs” (The ITU About page, 2022); the United Nations Educational, Scientific and Cultural Organization, UNESCO; the United Nations Conference on Trade and Development, UNCTAD; and, the United Nations Development Programme, UNDP), with the aim of sharing good practices with significant impact, in promoting the information society at local, regional, global levels. It was an opportunity to broadcast and promote the work that the WEIWER® research network has been developing, but, above all, to expand our international partners. This is particularly important, because, in fact, we perceive the WEIWER® research network as a result of partnerships between different institutions, especially in the area of education and training, working carried out based on the principles, programs and initiatives that we have been referring to, aiming, ultimately, to develop, life, key competences for the 21st century citizen, essential in different curricular areas and scientific domains.

#### 4. Final remarks

The International Academic Network WEIWER® includes, to the present, more than fifteen researchers from various academic and scientific Portuguese and international institutions, representing projects, protocols and partnerships, including at governmental and civil levels. By understanding the network as an interface that integrates and provides for the opening and sharing of knowledge (Cardoso et al., 2018), the WEIWER® team has recently completed three postdoctoral reports, six book chapters, seven papers in international journals, seven publications in books of proceedings, four publications in abstract books and held three WEIWER® Open Sessions (Cardoso, 2022). Simultaneously, we have been accepted in eleven scientific events, where we have presented outcomes from our work within the WEIWER® research, assuming a spirit of dissemination of knowledge according to the principles of open science.

Therefore, it is possible to recognize that the WEIWER® research network has been a catalyst for the acquisition of scientific knowledge and the establishment of collaborative links between researchers sharing common interests, in close connection with the Portuguese, European and international principles and practices on open science. It has also contributed to provide information and training for “different audiences, namely educational actors, about the potential of Wikis, and in particular Wikipedia, in training, research and education contexts” (Lucas & Moreira, 2018), in addition to disseminating knowledge, as mentioned in the last paragraph.

Our experience within the International Academic Network WEIWER® has shown that the research developed within networked settings fosters the consolidation of an open and sensitive space for socialization, by embracing autonomy, reflection and independence. Indeed, the collaborative and cooperative standards have helped us to carry out the projects and research studies upon

more consistent, sustained and thorough frameworks. In other words, our experience evidences that collaborative and networked research favors the (open) construction of knowledge. Furthermore, our experience and work also lead us to witness that scientific collaboration networks are a contribution to the realization of formal, as well as informal, synergies between researchers and institutions, both in the academic space and in their relationship with society in general.

In short, we consider that the collaborative research is rooted in inclusive values and provokes the co-construction and the awareness of the individuals (i.e., in this case, the researchers) (Halford et al., 2013); on the other hand, it promotes the creation of opportunities for sharing and reflecting, thus permitting to reach a collective dimension. To conclude, in the context of open science, academic networks, as is the case of the International Academic Network WEIWER®, provide for research networks capable of promoting the construction of knowledge in collective settings, creating enriching dialogues and understandings on the complexity of both the research objects and designs dealt with.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

### ORCID

Teresa Margarida Loureiro Cardoso  <http://orcid.org/0000-0002-7918-2358>

João Paulo Pinto  <http://orcid.org/0000-0002-8161-2513>

Filomena Pestana  <http://orcid.org/0000-0003-3146-8792>

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