Science Shop

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Definition

A science shop is defined as a collaborative space where communities, nonprofit organizations, researchers, and students work together to address socially relevant issues and problems (Frickel and Moore 2006). It emerged in this form in Europe in the 1970s, offering independent and participatory research support to civil society organizations (CSOs) willing to develop a research project in response to a particular concern.

A science shop is not a commercial shop, but an entry point into the university for anyone outside academia who is looking for answers based on a scientific approach to a problem. However, a single, uniform format that could easily be transferred does not exist. Some science shops operate as an integral part of a university, while others run as a social enterprise, an association, or a civics initiative. The members of a science shop – usually researchers, students, or academic staff and representatives of nongovernmental organizations (NGOs) – mediate the research process so that civil society, academics, and students become co-researchers or co-contributors. Two conditions quoted in the literature as criteria for science shop projects are: (1) The civil society organization does not bear the costs of the research; (2) neither the science shop nor the cooperating institution pursue commercial interests (Stewart 1988).

Research participation requires a collaborative approach among hybrid groups consisting of research professionals and civil society actors, such as NGOs, grassroots organizations, and residents. Members of a science shop act as mediators in the research process, enabling civil society, academics, and students to become co-researchers or co-contributors. Various stages of the research process require a form of cultural translation. Science shops support to translate civil society's concerns into research questions and provide participatory engineering. This mediation goes beyond dialogue or facilitation. The members of a science shop bridge gaps and create meaning where differences in vocabulary, experience, or knowledge make collaboration difficult.

Science shops depend on their context of emergence and are diverse in terms of the themes they address, the type of support they provide, their institutional position, and their governance. Nonetheless they share common characteristics. Based on a true co-production of knowledge between researchers and organized civil society actors, science shops produce the knowledge that democracies need to address today's social, health, and environmental challenges.

Civil society organizations reach out to science shops with an issue related to their activities, and the science shop, in return, provides support to partners throughout the research process, which typically occurs in several phases (Blangy et al. 2018). All phases involve both civil society organizations and academics, including students. The organizational process may differ from one science shop to another – depending on its institutional design, as science shops may be independent units or university-based – but it follows a common path: (1) gathering the request, followed by (2) translating it into a scientific issue, which is a critical point and the main added value of the support, (3) identifying an academic team to address the subject, (4) conducting the research work based on the co-production of knowledge, (5) returning the results to the actors and disseminating them widely, and (6) concluding with a reflexive phase of research evaluation that enables the system's improvement. Today, more than 50 science shops and comparable intermediaries exist in Europe, Tunisia, and Canada (Living Knowledge 2023).

Background

Following a long tradition of public engagement in research, science shops are part of a movement to redress a divide that emerged at the beginning of the 19th century. This global divide separated the scientific and academic spheres from all other kinds of knowledge, whether experiential, know-how, or user-based knowledge, among others. The construction of a disciplinary structure of science and the belief in technical progress (Habermas 1970) led to a high specialization of knowledge, excluding lay people from the margins of scientific endeavor. However, a countermovement emerged to adapt scientific research to the needs of society rather than the other way around. Several crises and epidemics highlighted the need for a more inclusive and systemic approach to knowledge production (as argued by Morin 1992).

Although a historical overview of science shops does not exist, scholars (Fischer et al. 2004; Millot 2019) agree on decisive turning points. The first wave of science shops started in the Netherlands in the 1970s. The phenomenon then spread throughout Europe due to a positive political and institutional climate. In contrast, the 1990s saw the closure of many European science shops, and in the 2000s even the Netherlands witnessed the demise of several historic science shops.

Only in 2010s were several new science shops established. In 2001, the European Union launched its Science and Society Program (European Commission 2001) to strengthen the societal impact of research. This program funded large research projects, which in turn triggered the rise of new science shops across Europe. Initially, a European network was established, today known as the *Living Knowledge Network*, which efficiently supports science shops in fostering public engagement and participation. Subsequently, many changes in the European governance of research have occurred. Some of them have favored the spread of science shops in European countries, such as the promotion of responsible research and innovation, participatory research, and open science (Rodriguez et al. 2013).

At the same time, a vision of technical democracy, or the empowerment of the public to participate democratically in scientific decision-making, emerged among researchers from different disciplines. This was partly due to the dramatic consequences of past scientific decisions, such as nuclear technology, genetically modified organisms, changes in occupations and jobs, and pollution (Beck 1992; Feenberg 1999). More recently, various trends and theories (Voorberg et al. 2015) have emerged (co-production, co-creation, etc.) to link different practices and methodologies, resulting in a semantic blurring. One remaining question concerns the new challenges science shops are facing. Rather than adapting to a new environment, and possibly reinventing themselves, science shops may initiate the cultural translation and the interdisciplinary process, while providing collaboration frames during the research projects. They also provide meta-analysis of the participatory dimension of the research and improve reflexivity.

Debate and criticism

When addressing societal challenges through a scientific approach, the crucial question is whether the knowledge generated is relevant to the lifeworld solution of the problem at hand. This is facilitated by a non-reductionist approach to the problem and the contextualization of research. Science shops contribute to this development through their constitutive bottom-up approach. In order to remain relevant in research and society, it is also crucial to reflect on their internal quality of intermediation and cultural translation capacity. If science shops are understood as a relevant link between civil society and science, the question of funding their cultural translation services between the logics of the science enterprise and civil society requires attentiveness. Interdependencies may arise from the forms of funding that affect both the interaction between society and science and the contribution of science shops to academic education.

Science shops find themselves in a difficult position between the need to find new social decision-making processes and the pressure of social closure move-

ments (Koppetsch 2019, 34). The tried and tested social negotiation processes of the past no longer seem sufficient to deal with the increased complexity of contemporary society (Latour 2018, 106). To what extent can or should the scientific community be experimentally involved in recent developments such as citizens' assemblies (e.g. Ireland) and major debates (e.g. France)? Phenomena such as populism (Inglehart and Norris 2016) can arise from the uncertainties resulting from the apparent mismatch between societal complexity and existing processing capacities, social closure movements, and tendencies towards greater hierarchization of societies. A reinterpretation and instrumentalization of the dialogical working principle of science shops can be the result. Science shops have to consider this essential aspect of the social ecosystem in which they operate. Such a reflection is equally important for established (as in Europe and North America) and emerging (e.g. in Africa) science shops, as well as for students using science shops as an academic resource: What kind of funding supports a science shop? What decision-making processes govern the interaction between civil society and science? How are civil society representatives involved in the evaluation of outcomes?

In the environment of a university-based science shop, the claim of a university's Third Mission have gained in importance. Transfer, transdisciplinarity, and participation provide a limited ecosystem for academic activities of young academics seeking tenure. At the same time, the social closure movements mentioned above are leading to a change in the capabilities, function, and reputation of science shops. As intermediators, science shops are seen as boundary crossers and disruptive forces at the same time. Neoliberal trends such as "the top-down implementation of competition and market principles under the aegis of New Public Management (NPM) in higher education and science has led not to more but to less professional freedom for those concerned" (Koppetsch 2020, 18, own translation).

The contemporary benefits of science shops are linked to their capacity to deepen and enlarge their main mission. Climate change and major social events as Covid 19 (Latour 2018) request a systemic review of science shops' modus operandi. Six aspects can contribute to enhance collaboration on eye-level: (1) The research question or underlying problem may affect *individuals*. It requires major attention to clarify who are the people that are actively involved in the project. (2) Science shops involve *students* and universities need to develop specific curricula and procedures for them. (3) The *leadership* for the research project can be taken by anyone. To widen the circle of participants or co-researchers, outreach efforts can be made to individuals and groups who may not have been involved initially. (4) An intended *co-research approach* involves collaboration between different actors. This approach aims to facilitate the equal participation of all stakeholders and to ensure that the research is guided by their collective knowledge and expertise. (5) Research projects may involve both *research and implementation*. The balance be-

tween these two aspects will depend on the specific aims and objectives of the project. Action and research can be thought of in the same systemic perspective to avoid getting caught up in narrow perspectives that lead to poor experiments. (6) Science shops approach researchers and students to offer them fair cooperation with *nongovernmental organizations*. It is possible to use a transdisciplinary team even if students are supposed to belong to one discipline.

Although solutions to some basic challenges have been identified, embedding them to academic routines and organizational procedures has proved difficult (Schlierf and Mayer 2013). Two key challenges remain: First, research in general and participatory research specifically is often constrained by a lack of time, as co-producing knowledge requires significant time investment. Second, a shortage of human resources, partly due to a lack of institutional recognition and dedicated funding, hinders successful cooperation (Bammer et al. 1992; Legris 2012).

Current forms of implementation in higher education

For budding academics, science shops provide a hands-on learning environment. In universities, the ability to recruit and train academics and students in participatory research and knowledge co-production is crucial for the implementation of science shops in higher education. To achieve this goal, specific training programs are to be designed and integrated into the curriculum, with community-based learning or service learning being the most common form (Ferrari and Chapman 1999; Hyde and Meyer 2004). In independent science shops, links with higher education institutions are established through personal networks, European projects, hiring of undergraduate assistants, and other means.

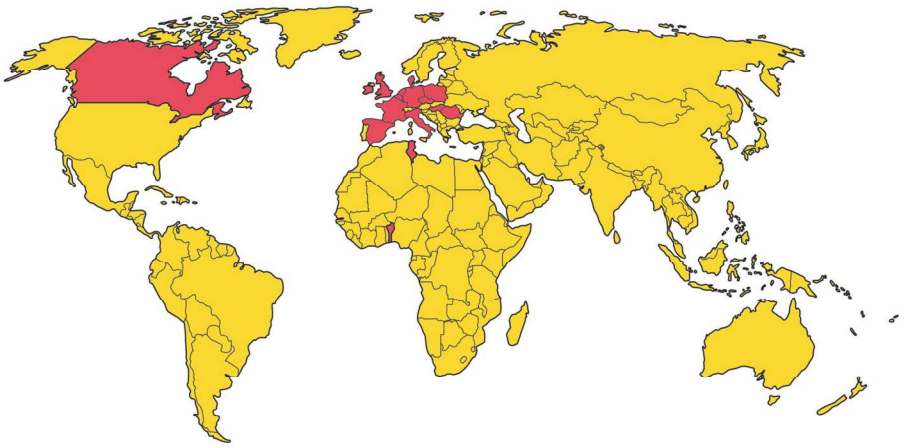
Students involved gain new knowledge and skills from the process of conducting research on real-life problems. They become familiar with the concept and practice of social responsibility, enhance their professional standing, for example by publishing the research and participating in conferences. In addition, their dissertations serve a purpose. The results of their research are often used to bring about meaningful change.

Science shops provide students with a support system that they can turn to for help with any problems or questions that arise during their research. Nevertheless, students may find it difficult to meet academic standards. New communication and pedagogical skills are needed to deal with multiple stakeholders. In terms of students' experiences, Rao et al.'s (2004) analysis of students' reports suggest that not all of them benefited or were equally satisfied with the experience. Some said they had problems interacting with the community in the field; others did well in the field but had problems with the research itself.

The link between science shops and transdisciplinarity is two-fold: First, science shops engage in cultural translation by promoting reflexivity in the collaboration between civil society and the scientific community. Second, they provide students with an opportunity to engage in negotiation processes on various levels, which they may not otherwise experience in their studies.

Science Shops appear as a mostly Western product of the dialog between science and society. Despite the lack of exhaustive survey, most of them are located today in Europe and Canada.

Figure 1. Geographical distribution of science shops in 2023. Source: own illustration based on data of Living Knowledge (2023), SYNO (2023), and own research.



A typology of science shops emerges from their organizational and institutional structure. (1) *University-based* science shops are the original form. In the 1970s, for instance, almost all Dutch universities maintained science shops that were fully integrated into the university structure (Dixon 1988). This integration provided them with stability. They were funded by the universities and other higher education actors. Today, this model is followed by the science shops of the University of Lille and TU Berlin, for instance. (2) A second group of science shops are *nongovernmental associations*, e.g. the Bay Zoltan science shop in Hungary. These institutions often charge for their services or apply for funding. (3) A third group of science shops belongs to the *private sector*. In France, for instance, science shops tended to be independent of universities (Dixon 1970), but they still relied heavily on public funding. Some organizations now accept requests from larger CSOs and commercial companies.

Two cases from Europe and one from Canada may illustrate the specific functionality of science shops.

1. The *FloFauMe* project aims to promote intergenerational measures for preserving urban biodiversity through citizen science cooperation between the Berlin district of Lichtenberg, the environmental NGO NABU, and the science shop of TU Berlin. It provides additional competences and supports cultural translation. Citizens are testing their hypothesis that planting large trees reduces heat in the city, and contribute to establishing a measurement network. FloFauMe involves other stakeholder groups and citizens in DIY workshops to build measuring devices.
2. The science shop at *Lille University* operates on a research ethic that promotes dialogue between different types of knowledge and partners in a relationship of parity and mutual recognition of knowledge. Its focus on participatory research, where the co-production of knowledge between researchers and actors is central, is a distinctive feature. The process begins with the demand from civil society organizations, which is translated into a research problem in collaboration with researchers from relevant disciplines and social actors.
3. The Research Shop at the University of Guelph, Canada, fosters collaborative and mutually beneficial community–university partnerships. Several programs are running, including a community-engaged teaching and learning program (supporting the design of university courses), a program on knowledge mobilization (to support campus-identified dissemination needs), and, more recently, the Guelph Lab. Projects in the Research Shop are undertaken by a small team of student research assistants, supervised and mentored by project managers, all under the supervision of the Research Shop Coordinator. For each project, a work plan is developed involving the community partner, students, and Research Shop manager, to agree the timeline, deliverables, and responsibilities.

In conclusion, the main outputs of science shops include the democratization of expertise, the co-creation of knowledge between researchers and communities, and the promotion of social justice and sustainability (Frickel and Moore 2006; Wibeck et al. 2022). Through science shops, community members, students, and researchers work together to develop research projects aimed at creating social change and promoting democratic, equal, and participatory practices Overall, science shops need to face many challenges while maintaining their inner characteristics favoring the common public good and peer-to-peer relationships.

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