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# Unveiling Pathways to Enhance Social Learning Processes in Water Struggles

**Daniele Tubino de Souza**

Water Resources Management Group, Wageningen University and Research, 6708 PB Wageningen, The Netherlands; daniele.tubinodesouza@wur.nl

**Abstract:** To advance actionable knowledge production in the context of water struggles, this article identifies ways to strengthen transformative learning processes within riverine social movements. The complex challenges associated with water struggles point to an increasing need to explore ways in which these processes can be shaped and to promote changes in the worldviews that inform how water and riverine environments are perceived and structured. This study draws on the grassroots movement for the social-ecological regeneration of the Taquara Stream in Porto Alegre, Brazil. Research on this case has shown that the actions conducted by this movement fostered learning processes through the creation of innovative forms of involvement that brought together multiple actors. A panel of experts conducted an in-depth analysis of the learning practices observed in this case. This article discusses five aspects of the learning process, which have been identified by the experts, that are essential to expanding the transformative potential of water-related social movements: (1) building relationships of trust between actors, (2) building links with and between key actors in the process, (3) creating dialogue spaces that promote the co-creation of actionable knowledge, (4) engaging actors spontaneously, proactively, and co-responsibly in the process, and (5) bringing participatory research into local processes.

**Keywords:** transformative learning; social learning; actionable knowledge; water struggles; social movements; river degradation



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## 1. Introduction

The widespread environmental degradation and contamination of urban rivers systems is a pressing problem that affects a large number of cities worldwide, most predominantly those located in the so-called Global South [1,2]. The scale and severity of this problem signals the urgent need to rethink approaches and procedures in order to find viable solutions for regenerating those systems [3–7]. Yet actions to this end are inherently complex. They require multi-disciplinary views on river systems that go beyond understanding them as just a natural resource to be preserved: material, technical, social, and symbolic aspects are simultaneously interrelated [5].

Mobilizing action to address such socio-environmental challenges requires the cooperation of diverse actors from a transdisciplinary approach supported by learning-oriented platforms from which actionable knowledge and systematic joint responses can emerge [8–10]. As such, cultivating the capacity to solve complex problems and establishing arenas for dialogue where conflicting visions can be exposed and articulated in order to deepen individual and collective critical reflection is a key factor to advancing the resolution of those challenges [11,12]. From this vantage point, collaborative actions and collective learning practices that are catalyzed by multi-actor groups working together to find solutions to overcome water-related issues stand out as fundamental endeavors that deserve further investigation [8,13–15].

Against this background, social learning offers an important theoretical framework for reflecting on the structuring and dynamics of collective processes towards socio-

environmental concerns. Social learning emphasizes learning practices aimed at transforming individual and collective views and practices [16–18]. It unfolds through dialogue encounters among engaged people in exploring ways of responding to common challenges, and has the potential to enhance collaborative processes, joint action, local governance, and the co-production of knowledge [18–20].

However, there is evidence that learning processes can vary in intensity and that the presence or absence of certain factors can enhance or limit the transformative impact of social learning [16,18,21]. In other words, people's views can be more or less transformed, and the knowledge and actions produced can be more or less effective in addressing a particular issue, depending on the characteristics of a group's diversity, how interactions unfold within a group, and the circumstances of the action [16,18].

Alongside approaches that focus on power and the winners and losers of contestation over rivers, their imaginaries, and their materialities (such as those in political ecology), this paper seeks to advance our understanding of the mechanisms and elements of learning processes that are generated within collective actions around water. Moreover, how these mechanisms and elements unfold can result in shifts in worldviews that shape our relationships with river systems and the ways we order them. Therefore, the central question addressed by this paper is: how can social learning processes in the context of social movements for the socio-environmental regeneration of urban river systems be strengthened to achieve this outcome? In order to answer this question, a panel of experts in the field examined the case of the Taquara Stream, located in the city of Porto Alegre in southern Brazil. The social movement around the Taquara Stream was based on the creation of actions, shared spaces for dialogue and learning, and the building of a broad support network, including the author of this article who became actively involved in the movement through action research. The aim of this movement was to mobilize the local community and stakeholders for the socio-environmental regeneration of the Taquara Stream and its catchment area. Based on the results of in-depth studies of this case, the experts identified five main facets of social learning processes that deserve special attention to maximize their impact in addressing this particular kind of problem.

First, key conceptual notions of social learning are presented in order to contextualize the main issues addressed in the analysis of the Taquara case. Second, the main research methods are outlined. Third, the Taquara case and the main insights from the research conducted on the case are presented. The discussion section critically reflects on the five main facets identified by the experts in light of the case and in relation to other studies. Finally, the concluding remarks are presented.

## 2. Key Aspects of Social Learning

Social learning is concerned with learning that takes place through practice–reflexive activities. In this type of learning, people learn from each other by recognizing and using the different perspectives present in the group to promote changes in values and beliefs at the individual and collective levels, as well as to expand their capacity to deal with complex issues [16,19,22,23]. The unfolding and effectiveness of social learning processes depends on the presence of interdependent and interrelated factors, such as the diversity of participants, fair access to information, dialogue processes, trust, facilitation, and network building [8,17,18,21,24,25]. Effectiveness can be understood here as the extent to which the social learning process has succeeded in transforming an existing predicament into a more desirable situation for those involved. Its results can be manifested at different levels, such as changes in the governance systems, in the interactive practices and dynamics of a group, and in the behavior, views, and values of the individuals involved in such a learning process [17,26].

The dialogue dynamics of a group towards solving complex problems is a central aspect of social learning: it is from within these interactions that change takes place. It is worth emphasizing that such a "dialogical unity" is not necessarily one that seeks consensus building, but one that can be better characterized as an "agonistic unity" that brings

together diverse actors [27]. As the Special Issue editors and article contributors make clear, water contestations take place among these diverse and often divergent actors and become apparent by reorganizing complex socio-technical, socio-material, and symbolic relations [28–32]. Agonistic disputes over rivers' material, socio-normative, cultural, political, and technological dimensions come together and manifest themselves in ontological arenas and disputed worldviews and epistemologies [33,34].

This means that it is important to analyze who makes up a group and what factors interfere with its dynamics. The coming together, permanently or temporarily, of people with different backgrounds, interests, and views, as well as gender, age, and political positions, to achieve a greater common goal provides a fertile environment for a potentially transformative social learning process. These contrasting positions can generate creative tensions, leading participants to question their own perspectives and those of others [12]. Thus, conflicting perspectives are not seen as something to be avoided in social learning, but rather as something to be harnessed for the most productive outcomes [12]. In this respect, two elements seem to be crucial: trust and facilitation.

The relationship between trust and learning is widely emphasized in the scholarly literature [14,16–18,20,21,35]. The greater or lesser the level of trust between participants affects their openness to share their views and knowledge, to engage in processes of self-reflection, and to be exposed to conflicting perspectives, as well as their ability to deal with the uncertainties inherent to a process of change [16,36]. The way in which participants interact (for example, by being open to listening, respecting, and appreciating others and being responsive and showing commitment to the process) is an essential factor in building trust [16]. Another factor that seems to interfere with trust building is the extent to which participants have repeated interactions over time [14]. Facilitation can also be related to the building of trust, as it can contribute to the improvement of listening styles and dialogue structure [37].

In social learning processes, a facilitator may play a key role in providing space for the balanced contributions of each participant, dealing with the dominance of some participants, and, where possible, recognizing and equalizing power imbalances within the group [21]. Clearly, it is important to be aware of what we might call the facilitation trap, which is, in other words, the building of an artificial consensus through a facilitation that suppresses dissonance without actually addressing the root causes of problems. Deconstructing views that are deeply entrenched and difficult to bring to the surface in a group dynamic may be necessary to overcome these problems. Facilitation can therefore have a negative effect if it prevents the emergence of tensions in a group that could otherwise be very useful in the uncovering of worldviews that are embedded in social structures.

When it comes to restoring river systems in vulnerable urban areas, collaboration between affected social groups and other stakeholders—such as representatives of the public sector and other civil society organizations—appears to be a key factor in promoting environmentally and culturally appropriate responses [3,4,6,17]. In this context, the rise of grassroots movements bringing together multiple actors in different contexts, continents, and scales (studies have widely discussed this topic in cases in Ecuador, Colombia, and Egypt, among others; see e.g., [29,34,38,39]) has been crucial in the struggle to restore rivers and promote water justice. Water justice struggles to call for the recognition and preservation of cultural diversity, identity, and multiple forms of knowledge [40,41]. Such processes imply learning, recognizing, and accepting ontological pluralism by creating, beyond a space for purely deliberative decision-making on issues related to the contested resource of water, a space for transforming the inherent antagonisms of multi-actor processes into an emancipatory agonism that embraces multiple views and exposes the power imbalances and injustices at the root of environmental degradation and vulnerability [42,43].

Nevertheless, grassroots movements dealing with water issues, in which different actors, including vulnerable communities, are brought together in emancipatory agonism and learning practices aimed at problem solving, can be characterized by significant epistemological differences between those involved [6]. In such cases, it may be essential to

establish spaces for interaction in which these differences can be acknowledged and navigated constructively [44]. In that context, social learning can contribute to the improvement of collaborative processes and agonistic emancipatory approaches aimed at enabling and empowering historically sidelined social groups to co-create local and systemic solutions aimed at improving the socio-environmental systems of river basins, as well as promoting socio-environmental justice, equity, and the well-being of the communities living in these areas [45].

In contexts of high socio-environmental vulnerability, it is also important to emphasize that the limited availability of resources can restrict the ability of social movements and the processes of collaboration and learning to flourish over time. Poverty and the neglect of the most affected groups can be obstacles to their engagement in actions that require an investment of time and financial resources. In this regard, the ability of actors to direct their actions according to the resources available and to form partnerships that can strengthen grassroots movements in water struggles is an important asset [33,34,46–48]. Network expansion usually diversifies the composition of members involved in the process and broadens the group's access to resources, knowledge, and skills that can be integrated, thereby strengthening and widening the scope of learning [49]. One such example is the creation of partnerships with educational institutions and participatory research endeavors that can engage with social movements and the social learning processes they generate. Such partnerships may be enabled, for instance, through citizen science projects, which are gaining traction and drawing significant research resources, to carry out participatory water monitoring projects that provide data that might inform requests to public authorities for improvements in local conditions and/or guide the formulation of public policies [50,51]. A further illustration is the use of social cartography through action research conducted with local communities whereby local imaginaries can be represented, land use degradation can be disclosed, and legal action can even be taken against activities that have severely damaged rivers, such as mining [52–54]. These practices embody social learning processes in which involved actors form a coalition grounded in dialogue and the critical understanding of local realities.

## 3. Methods

### *3.1. Research Approach to the Case of the Taquara Stream*

Participatory action research (PAR) was the overall research approach for the study of the Taquara Stream case. PAR is primarily committed to practical problem-solving and challenging traditional forms of knowledge production. PAR aims at social and political change and implies that all participants become co-researchers within a community of inquiry that critically reflects on their own practices and experiences [55].

This participatory action research project was carried out by the author of this article between 2016 and 2019. During this period, she consistently carried out participant observation and actively engaged in the actions of the movement to restore the Taquara Stream, producing a study that was both research and intervention. The author's personal involvement was essential for understanding the process through first-hand experience and for establishing a relationship of trust with the co-researchers, which made it possible to collect valid and reliable data. In addition, the potential of this position was used to jointly find alternatives for dealing with local problems and to extend the collaborative network of the movement.

As part of this methodological approach, various methods were used to capture a broad range of views on the subject under study, such as field notes, individual and group interviews, videos, photographs, recordings, and historical and interpretive texts. The data collected were organized into categories of observation. It was then analyzed comparatively in light of the theoretical foundations of social learning, along three analytical dimensions focused on the following: (1) the individual (attending to engaged individuals and their roles in the process), (2) the collective (concerning the leading group of the initiative and their collective learning practices), (3) the territory (addressing local socio-environmental

practices; institutional regimes and routines; and social, economic, political, and cultural factors at the root of the local problem).

### 3.2. Panel of Experts

The research findings on the Taquara case formed the basis for an in-depth analysis conducted by a panel of experts into the observed collective learning processes. The expert panel is characterized as an assessment developed by a group of people who have specific knowledge and analytical capacity on a given topic to offer a particular perspective on the subject [56]. The aim of this method was to broaden the space for reflection on the learning processes that were observed with the integration of the experts' visions and to verify the convergences and divergences between the experts' experiences and perspectives and the results found in the case.

The panel included four scholars who were selected from the network of contacts of the researcher, who have been investigating the topic of social learning, and who have research experience in the field of community learning processes in contexts mostly like the Taquara Stream case (Table 1; the participants have been given codes to preserve their identities). It should be emphasized that, in this case, more significant than the initial background of the experts is the qualification that could only be acquired through their personal engagement with a subject that requires deep commitment, dedication, and a long personal record of doing action research and of being involved with marginalized communities. Formal academic training, in this case, does not obviate the need for the in-depth experience of the problems of these communities, which allows for an understanding of the real needs and peculiarities of learning processes in these contexts.

**Table 1.** Members of the expert panel.

| | **Expert Panel** |
|---|---|
| E1 | E1 is a Professor at the Institute of Earth Sciences of the University of São Paulo (USP). E1 has a degree in geology, a Masters and a PhD in geosciences and the environment, and has conducted postdoctoral studies in mineral engineering and education. E1 works in the field of environmental education, applying the social learning approach in areas of socio-environmental conflict. |
| E2 | Architect and urban planner with a PhD in architecture from USP, E2 was a postdoctoral researcher (USP) working on the relationship between development policies and urban planning at the time of this study. E2 has been a consultant at the Urban Institute for the preparation of the UN conference document on housing and sustainable urban development (Habitat III). |
| E3 | E3 graduated from USP with a degree in Biology and a PhD in Education. E3's PhD examined social learning processes that took place in a riverine community in northern Brazil as a result of community mobilizations to cope with a disaster that occurred when the community was completely flooded for about four months. |
| E4 | E4 graduated from USP with a degree in Biology and a PhD in Environmental Sciences. E4's doctoral research focused on the experience of a school in the city of São Paulo that implemented active learning methodologies, guided by the premises of critical environmental education and social learning. |

The panel of experts met virtually. The process was divided into three stages: (1) familiarization, (2) mirroring, (3) synthesis. The familiarization stage consisted of sending the experts material containing a description of the Taquara case to provide an overview prior to the process. The other two stages unfolded over the course of the virtual interaction with the experts and were divided into two rounds: mirroring and synthesis. The mirroring stage was based on two questions aimed at identifying possible paths observed by experts

in social learning processes in communities. The purpose of this stage was to capture the experts' insights into social learning processes prior to their deeper engagement with the results of the Taquara case. The next stage of the discussion, called synthesis, began with a detailed presentation of the case study findings by the researcher. The results presented were largely focused on the individual and collective dimensions of the analytical framework adopted. After this presentation, the experts discussed the findings presented, raised questions to the researcher, and sought to synthesize the lessons learnt in light of their experiences in similar contexts and actions. The meeting was recorded and transcribed in full. The transcripts were tabulated, and the responses were grouped into common themes to provide a comprehensive account of the experts' contributions.

## 4. A Movement to Regenerate the Taquara Stream

The Taquara Stream is one of the main watercourses in Lomba do Pinheiro, a neighborhood of the city of Porto Alegre, southern Brazil (Figure 1). It flows through an area of intense informal urbanization and is currently in a state of severe ecological deterioration (Figure 2). The case of the Taquara Stream represents a pressing problem in many cities in Brazil, as well as in countries of the Global South, that are marked by the widespread environmental degradation and contamination of urban watercourses caused by the lack of urban infrastructure, inadequate sewage systems, the direct disposal of sewage and solid waste into water bodies, the irregular occupation of embankments, and the suppression of riparian vegetation [2,4]. This situation constitutes a characteristic pattern of socio-environmental vulnerability including poverty, precarious housing, population exposure to risks (such as landslides and floods), and the emergence of areas prone to the dispersal of pathogens [57].

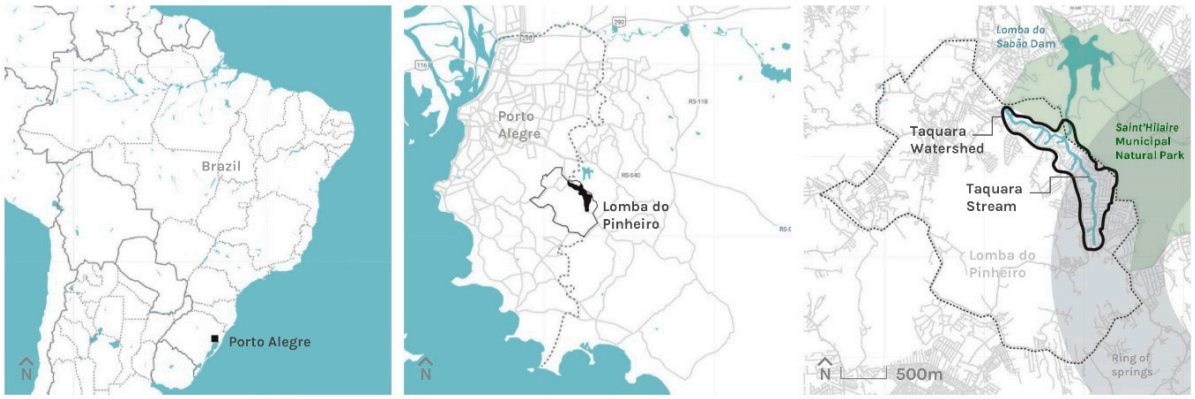


**Figure 1.** The Taquara Stream watershed in Lomba do Pinheiro, Porto Alegre [45].

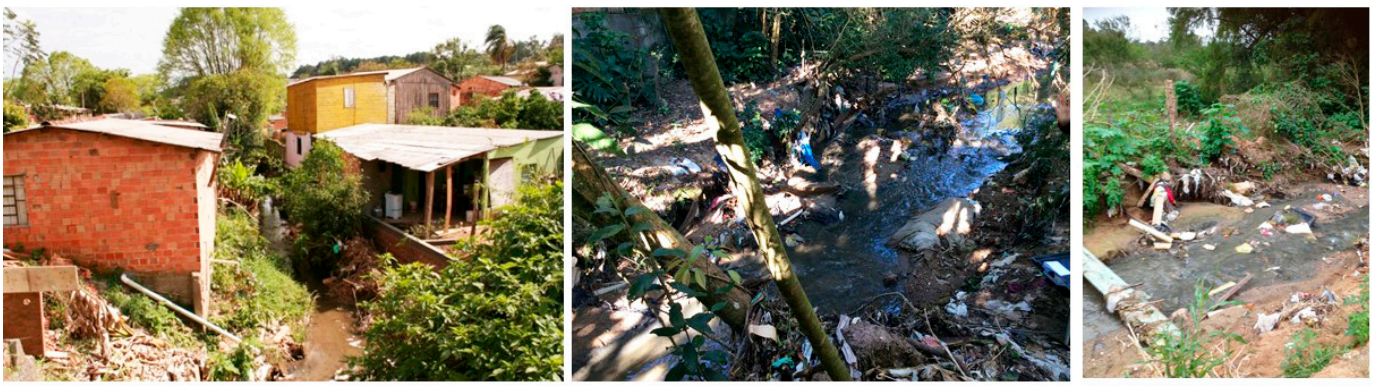

**Figure 2.** Hazardous conditions and the discharge of wastewater and solid waste into the Taquara Stream.

In 2015, a group of citizens involved in the Lomba do Pinheiro Community Garden—a key site in the neighborhood for the articulation of actions related to public health and environmental issues—and researchers from a local university carried out a diagnostic walk along the Taquara Stream. This action led to the creation of the Taquara Stream Watershed Working Group (WG) with the aim of promoting the socio-ecological regeneration of this water body and its catchment area.

The WG was composed of members of the local community, technicians from the public sector, and educational institutions (universities and municipal schools in the region), as well as volunteers who have contributed to the initiative. Between 2015 and 2019, the group has met twice a month in the community garden of Lomba do Pinheiro (Figure 3) or in the homes of the participating residents and has carried out various activities in the local community.

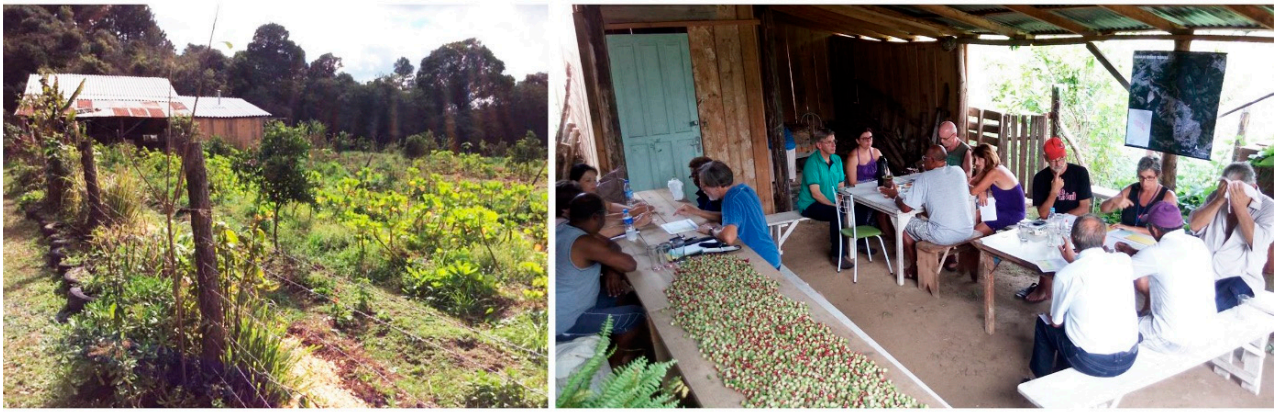

**Figure 3.** WG meeting at the Lomba do Pinheiro Community Garden.

The actions of the WG sought to change the predominantly top–down logic used to implement solutions to such problems, often neither inclusive nor based on a relational approach between involved actors. Conversely, it sought to implement actions focused on collaborative learning in parallel with the more immediate technical actions required by the current local conditions. The WG mobilized a variety of participatory activities adapted to the local circumstances, which were co-created by the participants and guided by an approach committed to the collective construction of knowledge that sought to give the local community a leading role, including marginalized groups that are usually excluded from the discussion and from decision-making processes on issues that directly affect them. These activities ranged from small-scale (involving up to 30 people) to large-scale mobilizations (involving up to 400 people), depending on their objective and target group (Figure 4). The former included, for example, cleaning up specific areas along the stream, talking to residents, and carrying out diagnostic walks and collaborative mapping (Figure 4A–C,F). The large-scale mobilizations included, for example, multi-stakeholder seminars to share the research results developed by support groups from local educational institutions (Figure 4D,E). Thematic events and protest walks were also organized. Such activities proved effective in establishing dialogue with the vulnerable populations living along the banks of the stream. The value of these larger actions has been the creation of opportunities for wider knowledge sharing and movement growth within and beyond the Lomba do Pinheiro community.


**Figure 4.** A few actions and events carried out in the Taquara Stream watershed area.

The assessment and analysis of how social learning processes unfolded within the WG was carried out through notes taken during participant observation, semi-structured interviews with members who were consistently present at the WG meetings (11 people), focus groups with these participants, and in-depth interviews with key participants. The analyses were structured on the basis of the multidimensional analytical framework presented in the Methods Section, which included individual, collective, and territorial dimensions, and in light of the social learning theories that informed this research.

The results were evidence of the participants' actual experience of social learning processes, at least at the level of the WG (individually and collectively). For example, participants reported recognizing how the diversity of viewpoints in the group and the exchange of knowledge facilitated by the dialogical interactions promoted changes in their perspectives on the case and contributed to the creation of new actionable knowledge through activities devised from the joint use of local and technical knowledge. The frequency of the WG meetings and their informal atmosphere, shared values, attentive listening, and facilitation that provided space and encouragement for everyone to have their say were elements associated with trust building—a key aspect in social learning processes. As a result, an increase in the co-creative and exploratory potential of the group was reported. Such findings and insights from this case (widely reported in key papers on the case, e.g., [45,58,59]) formed the basis of the discussion with the expert panel, which is discussed in the following section.

Nevertheless, the social learning processes were not studied in detail on a wider scale that involved the community that participated in the activities. However, at the territorial level, the crossing of boundaries between the different social actors involved (the local community, public sector technicians, and members of educational institutions) has produced practical responses to local problems. One of the concrete changes was the cleanliness of the spring, which no longer had rubbish dumped in it after the intervention (Figure 4A). Another result was the mobilization of the Health Surveillance Department when it was informed of the results of measurements of the quality of a stream water fountain, carried out in partnership with the local university. The department closed the polluted well used by the community, which was inadvertently a potential source of disease and introduced routine monitoring of its waters. Needless to say, these tangible results may seem small compared to the vast socio-environmental challenge faced. However, if the achievement of the long-term goal of river restoration and community well-being depends on new forms of grassroots governance, the less tangible outcomes manifested in this case through the innovative articulation between the local community, public authorities, and academia should not be underestimated.

## 5. Discussion

This section presents the key aspects that the expert panel considered essential to the success of the collective learning processes that took place in the Taquara case and that are broadly worthy of attention in similar processes and contexts. The experts analyzed and discussed the main research findings on the Taquara case in the light of their theoretical knowledge and practical experience in rural or urban communities and as action researchers focused on similar processes. Five key themes emerged from that discussion regarding aspects that require particular attention in order to maximize the transformative potential of social learning processes in the contexts at stake: (1) building relationships of trust between actors, (2) building links with and between key actors in the process, (3) creating dialogue spaces that promote the co-creation of actionable knowledge, (4) engaging actors spontaneously, proactively, and co-responsibly in the process, and (5) bringing participatory research into local processes.

The experts pointed to *building relationships of trust between actors* as a key aspect to deepening social learning processes. Based on their own practical experience and the Taquara case, they observed that learning processes thrive in an environment of trust, because participants are more likely to openly share their perspectives and engage in self-critical reflection. Transformative learning requires challenging one's own beliefs, and the people involved feel more comfortable taking intellectual and emotional risks in what they perceive as a safe environment [16,22,25]. In the Taquara case, building trust was linked to the perception of shared values among the WG's participants, which was reported to enable more open communication between the group's members as they felt that contributions were respected within the group. Other aspects that were reported to contribute to building trust were attentive and respectful listening between members during meetings [58,59]. Studies on collaborative water management processes have widely addressed the issue of trust building, linking it to improved relationships between multiple actors and local communities, greater efficiency in restorative environmental processes, and more equitable decision-making approaches [60–63].

On this topic, the experts emphasized the continuity of the interaction over a long period of time as an important aspect for the building up of relationships of trust. As evidenced in the case, the regular bi-monthly meetings of the WG and the development of joint actions over time were vital in strengthening ties and increasing the group's cohesion and trust [58,59]. Although scholarly research on this subject remains scarce, this is in line with the results of a study on the Zambezi basin in which continuous interactions and the trust built up through long-term social learning processes were fundamental to establishing new management practices for transboundary basins [14].

The second theme, *building links with and between key actors in the process,* is also closely related to the theme of trust. The experts drew attention to the fact that social movements that feature solid relationships with and between local leaders legitimized by the community and/or with members of local schools, community centers, and other locally recognized spaces can enhance the potential of the collective learning processes that take place within these movements [58]. These specific actors are often deeply embedded in the community and can foster the establishment of trust-based relationships among movement activists, thereby strengthening transformative learning processes [58]. One way in which the initiative spread through the community of Lomba do Pinheiro was precisely by establishing partnerships with local leaders, schools, and other initiatives such as the community garden, resulting in a broad and diverse network of support for the movement [59]. Conversely, the movement failed to expand in specific areas of the neighborhood where there was no support from local leaders or institutions.

The second theme is reflected in research on brokers and their fundamental role in the articulation of knowledge, group cohesion, and the promotion of new practices within a social movement. For example, research on the local ecological knowledge of subsistence-based communities as a source of adaptive capacity has shown that local leaders can act as critical brokers of knowledge transfer within and beyond their communities [64]. In this vein, research into the formation of shared narratives as structures of meaning that have the potential to convey knowledge and create new ideas about reality and the future and are thus key to addressing current environmental challenges can be more easily advanced by a trustworthy brokerage leader [35] (i.e., one who has been forged in a long-term collaborative process based on building cooperative partnerships).

The third theme, *creating dialogue spaces that promote the co-creation of actionable knowledge*, was characterized by experts as a key aspect of transformative social learning processes, wherein the way dialogue occurs plays a pivotal role. Creating actionable knowledge here means creating knowledge that can be translated into action to address socio-environmental challenges and transform social structures in practice, a notion that is directly related to the idea of praxis [10,65]. For instance, action research projects undertaken in partnership with riverside communities and using a variety of engagement modes, including intentional dialogue spaces, have gained momentum and represent a relevant means of co-producing action-oriented knowledge to transform these local realities [66–69].

The study of the Taquara case showed that the space for dialogue fostered by the WG was efficient, allowing for the integration of the different knowledges that coexisted in the group (for instance, local and technical knowledge), generating a more holistic understanding of the local problem and promoting a rich atmosphere that manifested itself in the generation of multiple ideas for various actions that were implemented in the territory over time [59]. This fertile and fluid space for interaction was largely attributable to the perceived high level of trust and respect among the group's members, a climate of friendly interaction, a sense of belonging and identity, and the embracing of diversity through attentive listening to each participant [58]. This is consistent with various studies on social learning, which stress that providing a safe space for interaction often leads to an enhanced group potential for co-creation and inquiry [16,21,70,71].

The absence of strong hierarchical positions within the group was also reported in the case and seems to have contributed to questioning and expressing views more freely, even when these differed [58]. In this respect, the role of a facilitator seems to have been crucial in the dialogue, which the expert panel indicated was aligned with their other experiences. If facilitation is carried out effectively, it can generally contribute to improved intra-group communication [44,72]. The WG meetings were actively facilitated by a member of the group who naturally took on this role, ensuring an equal speaking space and encouraging contributions from the involved actors.

A fourth theme highlighted by the experts as fundamental to social learning processes and their sustainability in the long term in the studied context was *spontaneous, proactive, and co-responsible involvement of actors in the process*. According to the experts, based on

their experiences, these factors can be directly linked to voluntary participation in social movements, stemming from an intrinsic motivation on the part of those involved. Research into the reasons for community involvement over time suggests that other-orientated and intrinsically motivated participants tend to stay involved in community actions for longer [73]. This theme has also been observed in debates about the promotion of the conservation of the commons through participation and the enhancement of intrinsic motivation, where the recipients of policy measures are marginalized [74]. Attention is also being paid to the relationship between intrinsic motivation and the willingness to participate in pro-environmental actions and to how biospheric values influence this equation and can be promoted [75]. Although the issue of intrinsic motivation is an aspect observed in studies on community initiatives and environmental protection, it still appears to be under-researched in the area of social movements and specifically in the context of urban rivers, as this study shows. This intrinsic motivation leads to a genuine interest in the issues at stake, encouraging greater persistence in the face of challenges, a sense of curiosity, an investment of effort, and more active participation in the learning process, as well as greater autonomy in the search for answers. For instance, research relating self-determination theory to intrinsic motivation in the context of learning processes in citizen science initiatives suggests that participants with high intrinsic motivation are more engaged and interested over time [76–78].

In the Taquara case, spontaneous participation also correlated with commitment to the movement, because participants tended to be more engaged as a result of their personal motivation [58]. This also seems to have contributed to better communication in the group, because people appeared to be more open and curious. In this regard, individuals also experienced the process as a source of pleasure and satisfaction, which prompted them to seek further action and knowledge to increase their capacity to address the problem and identify possible ways of overcoming the situation on the ground. The identification of shared values and the presence of affective bonds between group members were also factors that correlated with enhanced co-responsibility and group cohesion [59].

Notably, the experts also highlighted the importance of these aspects for the long-term viability of grassroots initiatives in contexts where there may exist demobilizing factors. Examples of demobilizing factors include insufficient financial resources to carry out the activities, the unresponsiveness of government departments concerned with the problem, adverse political circumstances that create barriers or imply insufficient government involvement, and apathy on the part of the local population. These factors were also identified in the case of Taquara as obstacles to the further expansion of the local movement.

The last theme raised by the experts was *bringing participatory research into local processes*. In the Taquara case, the involvement of the action researcher contributed to local learning practices by supporting the structuring of spaces for dialogue, the systematization of the universe of local ideas, and the strengthening of existing networks. In line with the experience of the experts, the researcher's active involvement in the Taquara case also led to the expansion of the initiative's network of allies, because she linked the movement to other academic researchers in her network who became involved in the initiative, for example, by incorporating the case into their research and undergraduate courses (e.g., courses on water quality monitoring) [45]. Here, the researcher can be seen as a broker. The broker is the contributor capable of making connections between different systems of practice and/or able to make further links with other stakeholders in order to foster local solutions [79].

The integration of educational institutions with social movements, as exemplified by citizen science projects, has proven to be a significant reinforcement of local claims [80–82]. Citizen science initiatives not only create opportunities for citizen engagement, as in participatory water monitoring projects, but also enable the gathering of compelling evidence that can be presented to authorities, catalyzing action to address and remediate environmental-related challenges [83,84]. As the experts pointed out, partnerships between academia and society can lead to new forms of long-term collaboration. In the case of Taquara, this was

illustrated by the implementation of routine water monitoring in a section of the stream by the Health Surveillance Department, based on the results of academic research carried out in the area [45]. Similarly, alliances with other organizations were also considered important in strengthening local movements. In the Taquara case, the Lomba do Pinheiro Community Garden, a well-established initiative in the area, provided vital support for both the creation and sustainability of the movement over time [58].

## 6. Conclusions

The aim of this article was to provide insights into the strengthening of social learning processes in the context of social movements for the socio-environmental regeneration of urban river systems. For this purpose, the case of the Taquara Stream, located in Porto Alegre, Brazil, was analyzed by a panel of experts. The initiative to regenerate the Taquara Stream was based on a series of actions designed to critically engage the local community and to implement improvements in the local socio-environmental conditions according to the principles of social learning. The focus was on action at the local level, where practical needs are experienced and where there is the capacity to mobilize communities and groups directly affected by a specific issue. The emphasis was on the experiential dimension and the relational approach of social learning processes. The expert panel identified five key themes that deserve particular attention in such movements: (1) building relationships of trust between actors, (2) building links with and between key actors in the process, (3) creating dialogue spaces that promote the co-creation of actionable knowledge, (4) engaging actors spontaneously, proactively, and co-responsibly in the process, and (5) bringing participatory research into local processes.

The key themes identified by the experts could help communities to think about structuring and developing new forms of collective action that focus on integrating a plurality of visions and a diversity of practices, aimed at improving collaborative processes with a practical–reflective approach. In practical terms, by problematizing local issues and valuing the critical participation of the different actors involved, community-based movements may be strengthened. However, it is important to take a contextualized view of these experiences. Each context, social movement, and challenge will inevitably have its own set of unique and complex elements that need to be taken into account when thinking about how to promote collective learning processes.

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