



# Assembling River Perspectives: Using a Jigsaw Puzzle to Co-Create a Traveling Exhibition about the Danube River

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## Abstract

Protecting and restoring rivers and floodplains, which are affected by many different human activities, requires the active participation of stakeholders and citizens. To support this, a co-creation approach was developed to gather citizens' suggestions for conceptualizing a traveling exhibition on the Danube River that would provide environmental education about river and floodplain management. Because we aimed to reach citizens from a variety of cultural backgrounds in several countries, we developed a poster-sized interactive and collaborative wooden jigsaw puzzle of the Danube basin. This was used as an intuitive and integrative platform for interactions among citizens and stakeholders while they assembled the 88 pieces of the puzzle, to which they added Post-it® Notes with ideas for a future traveling exhibition to each puzzle piece. The Puzzle Wall was presented at 10 sites, mostly within the Danube basin, where 527 responses were collected from over 300 participants. This large-format puzzle map proved a successful engagement tool that motivated participants to share their insights and express their preferences, hence taking collective responsibility for addressing critical challenges in Danube River management.

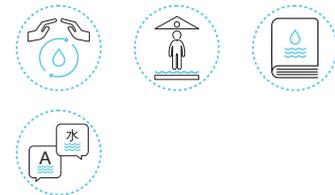
## Policy Recommendations

- Participatory approaches that include stakeholders may improve environmental education efforts.
- An Interactive Collaborative Danube4all Puzzle Wall represents a suitable engaging platform to motivate citizens to contribute their ideas.
- The display of the Danube basin on the puzzle supported awareness of the necessity of cross-border collaboration for community engagement efforts and collective responsibility for shared ecosystems like the Danube River.

## KEYWORDS

Danube  
exhibition concept  
participatory approach  
citizen engagement  
multicultural context

## WATER VALUES



## CLIMATE



**Cfb:** Temperate oceanic climate



< Fig. 1 The completed Danube4all Puzzle Wall showcasing contributed notes, IGB Summer Party (Source: Gabriela Costea, 2024).



## Introduction

The Danube River is a lifeline for countless communities in 10 countries and a biodiversity hotspot. It is also facing unprecedented environmental and socio-economic challenges, including pollution, habitat degradation, floodplain loss and increasing pressures from climate change, with more extreme events affecting agricultural production and residents' quality of life. To promote the conservation and restoration of its water-dependent ecosystems, the EU Horizon project Danube4all, as part of the EU mission Restore our Ocean and Waters 2030, hopes to deepen people's sense of connection to the Danube's natural systems. Strengthening this connection is essential, as many of the Danube's environmental challenges stem from unsustainable human uses of land and water resources, such as river regulation, agricultural runoff, urban expansion, and hydropower development. Effective mitigation approaches can only be achieved when citizens, stakeholders and decision-makers are actively involved in transformation processes and understand their shared dependence on healthy river and surface water systems.

Within this context, Danube4all has developed a plan to restore the longitudinal connectivity of the river network in the Danube basin in close collaboration with stakeholders, thereby also considering citizens' interests. By fostering a sense of connection and responsibility among citizens, the project aims to create public support for restoration measures, encourage co-creation, and build trust between communities and institutions working across the basin.

A key initiative within the project is the co-design of a concept for a traveling Blue Danube exhibition, which aims not only to inform the public about the river's ecological and cultural



^ Fig. 2 Participants writing their responses on notes, general public from Upper Danube at THE ECSA Festival Vienna (Source: Gabriela Costea, 2024).

significance but also to strengthen emotional connections between people and the Danube. Such emotional linkages are essential for raising awareness and encouraging people to take responsibility; participatory formats invite people to reflect on their role in the river system. This combination can mobilize local knowledge, stimulate dialogue across cultural and national boundaries and inspire collective action.

Topical exhibitions represent powerful tools for education, engagement and storytelling. Traditionally, their development has been driven by research or expert-led approaches (Piacente 2022), in which scientists, curators and educators shape narratives and develop presentations grounded in their specialized knowledge. While this emphasis on expert knowledge and expertise can ensure a high level of accuracy and depth, it often overlooks the perspectives of local communities and target groups in ways that limit an exhibition's relevance and resonance among intended audiences (Wang and Lei 2016).



^ Fig. 3 Participants writing their responses on notes, water museum experts at the WAMU-net Conference Porto (Source: Gabriela Costea, 2024).

In contrast, public-driven exhibition concepts emphasize inclusivity and collaboration by actively engaging audiences in the development process, enabling them to co-create and co-produce, drawing on their own experiences (Barnes and McPherson 2019; Simon 2010). This participatory approach shifts the paradigm from a one-way dissemination of knowledge to a collaborative approach in which the public contributes ideas, perspectives and priorities. Such a participatory approach may not only enrich exhibitions by incorporating a broader range of experiences and values, but also enhance engagement by fostering critical thinking, creativity and a sense of ownership, ultimately inspiring positive action (Simon 2010; Knudsen 2016).

The Danube4all traveling exhibition concept has adopted this participatory vision to ensure it will resonate with diverse target groups, including the general public, researchers, project partners, public authorities, NGOs, and museum professionals, across the Danube region – from the river's source to its delta. Each of

these groups has a distinct relationship with the river, shaped by different experiences, responsibilities, and its accompanying challenges and assets. A collaborative curation process is especially well-suited to capturing this diversity and ensuring the exhibition reflects the experiences, priorities and values of the communities it seeks to engage. It is also especially appropriate for a traveling exhibition, as the Danube connects multiple countries and cultures while facing transboundary challenges such as habitat loss, pollution and climate-related shifts in water availability and water needs. Moving across regions, the exhibition will highlight both local particularities and shared concerns, creating a platform for dialogue among communities separated by distance and language. The traveling format also ensures that knowledge about river restoration and sustainable management reaches diverse audiences in many countries, including those in remote areas with limited access to such information. In this way, the exhibition not only will reflect the needs and interests of different audiences but also reinforces



^ Fig. 4 Participants' Post-it® Notes responses were attached to puzzle pieces and then placed on the magnetic whiteboard (top left: general public from Upper Danube at the ECSA Festival Vienna; top right: general public from Lower Danube at the RowMania Tulcea, bottom: partners of other Danube Lighthouse projects at the EcoDaLLi Living Lab Ulm) (Source: Pippa de Kinder and Gabriela Costea, 2024).

the understanding of the Danube as a shared lifeline whose protection and sustainable future requires collective awareness and action. Engaging such diverse audiences requires inclusive and stimulating methods capable of connecting personal and collective experiences while fostering curiosity and collaboration (Hein 1999).

### **The Interactive and Collaborative Danube4all Puzzle Wall**

At the heart of this bottom-up initiative, the Interactive Collaborative Danube4all Puzzle Wall formed an integral part of the curation process used to develop a future traveling exhibition. It was identified and tested as an innovative way



^ Fig. 5 The completed Danube4all Puzzle Wall showcasing contributed notes, ECSA Festival Vienna (Source: Gabriela Costea, 2024).

to attract attention and encourage involvement among citizens, who were invited to contribute insights and ideas in a structured framework. The Puzzle Wall employs a large-format jigsaw puzzle map representing the entire Danube basin and invites participants to make personal and intellectual contributions to the planned Danube exhibition by responding to three sets of guiding questions. These questions follow the interpretive hierarchy recommended for museum professionals in exhibition content development (Smithsonian Exhibits 2018):

- Key messages: Which facts, aspects and stories about the Danube and its valley would you like to see featured in our future Danube exhibition? Responses help exhibition planners to identify the core messages

that should remain with visitors after engaging with the exhibition.

- Critical questions: If you could influence the management and conservation of the Danube and its valley, what are the most pressing issues you would address? Responses provide insights into which critical questions the exhibition should address in order to stimulate dialogue and critical reflection.
- Visualization methods: When visiting exhibitions, what captures your attention? How would you prefer information to be presented in a traveling exhibition about the Danube? Responses to these questions guide the selection of presentation formats, from interactive elements to multimedia and visual storytelling techniques, helping to ensure accessibility and inclusivity.

The authors invited participants to share their responses by writing them on Post-it® Notes (fig. 1). Each note was then attached to one piece of the puzzle, which was then placed on a magnetic whiteboard (fig. 2) and then step by step complementing a visual representation of the Danube basin in a collaborative manner (fig. 4).

This participatory exercise was implemented at a variety of events held along the upstream, midstream and downstream sections of the Danube. Along with citizens of all ages, experts in aquatic ecology, staff from authorities, NGOs, and representatives from water museums participated, ensuring a balanced integration of public-driven inclusivity with research-driven scientific rigor. This dual focus supports the traveling exhibition's educational impact, helping to make it meaningful and relatable to diverse communities.

These interactive co-creation activities were conducted during 10 events between April and November 2024, engaging more than 300 participants who provided 527 responses to the guiding questions (table 1). Participants were encouraged to post either one or several responses. Displays of the Interactive Collaborative Danube4all Puzzle Wall were linked to larger events, such as Citizen Science Festival in Austria; Aquarium Day in Karlovac, Croatia; outdoor festivals in Ulm, Germany, and Tulcea, Romania; as well as workshops, conferences and meetings across the Danube basin.

Whenever the activity was conducted, the puzzle was started from scratch, allowing each community to collectively rebuild the river puzzle and to fill it with their own perspectives. These varied settings reflected the travel route of the envisioned exhibition, and enabled contributions from a wide array of audiences.

The authors conducted an initial analysis of the 527 Post-it® Notes contributions and have identified the following recurring themes, regional priorities and diverse perspectives as crucial input for shaping the content of the traveling exhibition:

- Regional context matters: Nature and Biodiversity emerged in the results as a top priority in the Middle Danube region, whereas History and Heritage was emphasized more strongly in the Upper Danube.
- Audience type matters: While the general public tended to prioritize Human Impacts, experts placed greater emphasis on Nature and Biodiversity.
- Visualization preferences: Preferences for display methods within the planned exhibition were mostly similar across regions, with some subtle regional differences. The detailed results of this analysis, including key insights and trends, will be presented in a forthcoming publication.

To complement in-person participation, a QR code linking to the questions was distributed, offering a digital option for input. However, no responses were received via the QR code, underscoring the value of in-person, hands-on activities for eliciting citizen contributions. This result highlights the importance of engaging formats, such as the Interactive Collaborative Danube4all Puzzle Wall, in fostering meaningful participation.

The collected insights offer a rich foundation for shaping the Blue Danube traveling exhibition. The co-creation process helped to ensure that the voices of diverse communities became integral to the exhibition's development, fostering a shared vision of sustainable stewardship for the Danube basin.

## Conclusion

The bottom-up, collaborative approach of the Interactive Collaborative Danube4all Puzzle Wall aligns with broader trends in participatory exhibition development. Comparable approaches include co-creation processes in museum exhibitions, where visitors actively contribute content, narratives, or interpretative perspectives (Minott 2019; Nakashima and Del Gaudio 2022), as well as participatory exhibition formats that emphasize learning through shared

experience, dialogue, and place-based engagement (Mygind, Hällman and Bentsen 2015; Ferguson and Renner 2019). However, these participatory approaches have focused mostly on culturally homogeneous target groups. Our approach applies tailored engagement strategies to capture citizens' contributions from geographically and culturally diverse regions, accommodating differences in languages, local identities, historical relationships with the river, and varying socio-economic and environmental contexts along the Danube Basin.

No	Event	Date	Nr. of Records	Nr. of Participants	Audience Type	Danube Region
1	Danube Festival Ulm (DEU)	10 Jul 2024	35	22	General public (visitors)	Upper Danube
2	ECSA Festival Vienna (AUT)	06 Apr 2024	108	68	General public (museum visitors)	Middle Danube
3	Aquatika – Freshwater Aquarium Karlovac Birthday (HRV)	19 Oct 2024	152	N/A	General public (aquarium visitors)	Middle Danube
4	Aquatika – Freshwater Aquarium Karlovac Workshop (HRV)	23 Oct 2024	54	40	Pupils	Middle Danube
5	RowMania Tulcea (ROU)	07 Sep 2024	15	15	General public (event visitors)	Lower Danube
6	Close Project Timisoara (ROU)	21 Nov 2024	37	17	Authorities, NGOs, students	Lower Danube
7	Danube4all Annual Meeting (Srb)	24 May 2024	42	28	Researchers, project partners in DANUBE-4all	Upper, Middle and Lower Danube

^ Table 1. Overview of the co-creation events, detailing the date, number of responses collected, number of participants, audience type assessed and the corresponding Danube region represented (Source: Gabriela Costea, Pippa de Kinder and Martin Pusch, 2026).

The Danube4all Puzzle Wall initiative exemplifies how participatory processes and community engagement can enhance content creation. When content creation is the goal, as in our case, contributory participatory approaches are particularly effective for gathering ideas and perspectives. In this model, participants contribute content (e.g. themes, questions, preferences), while curatorial responsibility and final decision-making remain with the project team, ensuring coherence, feasibility, and alignment with scientific and educational objectives (Simon 2010). This exercise reaffirms the importance of integrating community involvement within the exhibition development process itself, rather than treating engagement as a separate or secondary activity. In line with Barnes and McPherson (2019), it highlights that participatory engagement is a core component of exhibition development, essential for shaping relevant, inclusive, and socially responsive exhibition content. While participatory approaches require additional time and resources, they offer significant benefits, as evidenced by their growing importance in museum funding and role in community regeneration. As noted by Lynch (2011), museums that actively involve communities – such as through co-created exhibitions, local storytelling projects, or partnerships addressing social and environmental challenges – are increasingly recognized and supported as agents of social value, inclusion, and local development.

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#### **Useful Links**

<https://www.danube4allproject.eu/>

## References

- Barnes, Pamela, and Gayle McPherson. 2019. "Co-Creating, Co-Producing and Connecting: Museum Practice Today." *Curator: The Museum Journal* 62 (2): 257–67. <https://doi.org/10.1111/cura.12309>.
- Ferguson, Maria, and Kate Renner. 2019. "A Museum without Walls: Community Collaboration in Exhibition Development." *Museum Scholar* 2. [https://articles.themuseumsscholar.org/2019/05/01/tp\\_vol2fergusonrenner/](https://articles.themuseumsscholar.org/2019/05/01/tp_vol2fergusonrenner/).
- Hein, George E. 1999. "Is Meaning Making Constructivism? Is Constructivism Meaning Making?" *The Exhibitionist* 18 (2): 15–18.
- Knudsen, Line Vestergaard. 2016. "Participation at Work in the Museum." *Museum Management and Curatorship* 31 (2): 193–211. <https://doi.org/10.1080/09647775.2016.1146916>.
- Lynch, Bernadette T. 2011. "Custom-Made Reflective Practice: Can Museums Realise Their Capabilities in Helping Others Realise Theirs?" *Museum Management and Curatorship* 26 (5): 441–58. <https://doi.org/10.1080/09647775.2011.621731>.
- Minott, Rachael. 2019. "The Past Is Now: Confronting Museums' Complicity in Imperial Celebration." *Third Text* 33 (4–5): 559–74. <https://doi.org/10.1080/09528822.2019.1654206>.
- Mygind, Lærke, Anne Hällman and Peter Bentsen. 2015. "Bridging Gaps between Intentions and Realities: A Review of Participatory Exhibition Development in Museums." *Museum Management and Curatorship* 30 (April):117–37. <https://doi.org/10.1080/09647775.2015.1022903>.
- Nakashima, Sophie, and Chiara Del Gaudio. 2022. "Museum and Exhibit Design: How Forms and Places of Knowledge Exchange Influence Community Participation and Empowerment." In *DRS2022: Bilbao*, 25 June - 3 July, Bilbao, Spain, edited by D. Lockton, S. Lenzi, P. Hekkert, A. Oak, J. Sádaba and P. Lloyd. Design Research Society (DRS). <https://doi.org/10.21606/drs.2022.538>.
- Piacente, Maria. 2022. *Manual of Museum Exhibitions*. Rowman & Littlefield.
- Simon, Nina. 2010. *The Participatory Museum*. <https://participatorymuseum.org/>.
- Smithsonian Exhibits. 2018. *A Guide to Exhibit Development*. <https://exhibits.si.edu/wp-content/uploads/2018/04/Guide-to-Exhibit-Development.pdf>.
- Wang Qi and Yanhui Lei. 2016. "Minds on for the Wise: Rethinking the Contemporary Interactive Exhibition." *Museum Management and Curatorship* 31 (4):1–18. <https://doi.org/10.1080/09647775.2016.1173575>.



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