

VizGames: Workshop on Visualization Play, Games, and Activities

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ABSTRACT

Games have long served as powerful tools for education, promoting interactivity, engagement, and critical thinking. They bring unique value by immersing participants in structured, rule-based environments encouraging exploration and learning. In data visualization, games allow users to engage with data meaningfully, enabling shared discovery and insights. Current initiatives in the visualization community have mostly centered around education, emphasizing literacy and foundational skills. However, these efforts overlook a crucial opportunity: visualization games can also drive interdisciplinary collaboration, co-creation, and problem-solving, but there is no dedicated platform for exploring these broader applications. Therefore, we propose “VizGames: Workshop on Visualization Play, Games, and Activities” as the first dedicated workshop of its kind, showcasing novel applications that extend beyond education. This workshop aims to establish visualization games as tools for communication, collaboration, and innovation, supporting broader applications in research and practice.

1 INTRODUCTION

Games are structured forms of play that engage participants through rules, goals, competition, or collaboration. They create environments where individuals can explore complex concepts, develop skills, and support their creativity. Games have been successfully incorporated into various subjects, ranging from mathematics and science to history and language [24, 31] and have emerged as powerful concepts, demonstrating their ability to enhance learning experiences. Moreover, by incorporating elements of interactivity, engagement, and a sense of challenge, they present an opportunity to promote collaboration (fostering teamwork), competition (encouraging innovation), critical thinking, problem-solving, and decision-making skills. They can be leveraged as a methodology to make abstract ideas more tangible and communicate complex concepts [14].

Generally, the terms “*games*” and “*play*” are often used freely and suggestively—an issue that has been the subject of many discussions among researchers and game designers. Avedon and Sutton-Smith [4] acknowledge the elusiveness of the terms and, like many

other authors, agree that no definition can include all kinds of games and game-like activities that have been created in various cultures, especially if seen through the lenses of different research disciplines. Still, many definitions in various research works mention common traits of games, such as being a voluntary activity, having accomplishable goals, being defined by a set of rules, and having win/lose conditions [29]. However, some games still fall outside these strict definitions if they, e.g., lack win/lose conditions. To address this, Schell [29] offers a more inclusive definition that aligns with the vision of our workshop:

“A game is a problem-solving activity, approached with a playful attitude.”

Games and Playful Activities in Visualization: While many games possess educational qualities, their values do not solely lie in education and literacy. The entertainment aspect of games and immersive activities [15] can be centered around shared discovery and innovation. Conversely, games developed exclusively for education and literacy often struggle with creating internal value and player engagement, limiting their effectiveness [32].

The role of games and interactive activities can go beyond just being applied to teaching concepts and explore their capabilities in fostering collaborative work and interdisciplinary communication. For example, interactive tools, such as *Construct-a-Vis* [6] and *Diagram Safari* [13], showcase how visualization games can enable participants to engage with data, learn about new concepts, and communicate concepts and ideas in ways that can be extended to other collaborative contexts. Storytelling-inspired games, such as the ones designed by Huynh et al. [20] and Ambrosini et al. [3] further illustrate the potential of such tools and approaches to foster exploration and shared insights, also within very specific application domains such as healthcare [30].

Beyond digital and storytelling-based approaches, different mediums have been incorporated. For example, sketches to analyze how data is interpreted [5] and card games where a player selects a visualization and another needs to guess it [2] have been explored to enhance the comprehension of visualization concepts. However, the potential of games in visualization is not limited to education. Beyond teaching, games and activities in visualization can support collaborative work, communication across disciplines, and innovative design approaches in a range of contexts. A non-exhaustive list of application contexts includes:

• Idea Generation

- Games can further foster co-creation and encourage participatory design by providing open and playful environments for participants to collaborate and share their ideas [7]. This encourages active participation and promotes creativity, enabling to look at the problem from diverse perspectives, various opinions, and incorporating feedback throughout the development [25].

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- *Support Decision-making*
 - Visualization games can also be leveraged to gather large amounts of data on human perception and decision-making [16]. In this case, games including aspects like clustering, ranking, or identifying anomalies can generate valuable behavioral data. The outcomes can be used to assist in the analysis of how people interpret different visual encodings or network layouts [10].
- *Enable Stakeholder Engagement*
 - Utilizing games in inter- and transdisciplinary contexts can enhance communication between experts, fostering a better collaboration [11]. Games create a shared space for dialogue, helping to bridge gaps between disciplines and facilitate the creation of a mutual vocabulary and understanding of complex problems [12, 26].
- *Visualization Design Evaluation*
 - Activities and games can act as an (informal) method to gamify testing or evaluation of new visualization designs or interaction techniques [1]. In such cases, participants can engage with prototypical implementations of the techniques in *game-like* settings, allowing to observe usability and interaction flow [6]. This approach could be beneficial for pre-testing (pilot) before conducting formal studies.
 - Further use-cases of games can be in evaluating and benchmarking cognitive load and task performance. For example, by setting up a competitive environment with timed challenges [10], studies can be devised to evaluate performance through traditional metrics (accuracy and response times) and make it easier to compare how different visualization techniques or encodings affect the cognitive load of the viewer [1].

Mission: Our mission is to advance visualization games and playful activities as dynamic tools for communication, co-creation, and collaborative problem-solving in interdisciplinary environments and contexts. We aim to explore how these interactive approaches can be leveraged to facilitate idea generation, support complex decision-making, enable stakeholder engagement, and be useful in the evaluation of visualization design(s). This workshop will highlight innovative applications of visualization games and activities beyond education, emphasizing their potential to enhance dialogue, shared understanding, and creative solution-finding in real-world contexts.

The visualization community has a notable track record of advancing educational discourse through various independent initiatives. These efforts include IEEE VIS workshops on Visualization Education, Literacy, and Activities in 2023 and 2024 [21, 28] as well as workshops on data visualization activities to support learning, reflection, and discussion [18, 19]. In addition, an IEEE VIS 2015 panel addressed teaching across the researcher-practitioner gap [17]. The VisComm Workshop series at IEEE VIS (2018-2023) [27], which focuses on visualization for communication, is also an initiative related to our planned workshop. Additionally, conferences like CHI PLAY [9] and CHI [8] offer “Interactivity” tracks that offer a hands-on setting to showcase work on interactive experiences in games, art, and design. We believe such a forum format would create a valuable space for participants to share and discuss their own games and playful activities, enabling everyone to gather ideas and resources to use in their own research and classes.

2 WORKSHOP GOALS

Building on the success of the hands-on, interactive formats of CHI PLAY [9] and CHI [8], we would like to emphasize showcasing visualization games and playful activities through live interactive sessions and demos. The main vision of our workshop is to invite researchers beyond the EuroVis community such as game designers, designers, practitioners, science communicators, psychologists, or HCI researchers to attend the conference and foster interdisciplinary exchange and share research results and best practices. The **goals** of this workshop are to:

- *Demonstrate visualization games* (e.g., card games, digital games, etc.) and *engage with the audience* by playing the games at the conference, in a World Café setting.
- *Publish extended abstract* (2–6 pages in the VizGames template format, including a title, pictures, abstract about the activity, preparation and schedule, reflection & conclusion on our workshop website and Eurographics DL).
- *Curate a repository for collecting and sharing visualization games* for diverse audiences (e.g., children/adult learning, data journalists/data scientists/computer scientists/designers) in different scenarios (e.g., onsite, online, hybrid) with varying objectives.
- *Create a discussion platform* to exchange experiences, best practices, and challenges while developing visualization games.

3 WORKSHOP ACTIVITIES

In detail, the half-day workshop will include a fast-forward session, a hands-on session in a World Café style of the submitted visualization games, and a reflection session where the attendees of the World Café tables talk about their experiences during the hands-on session.

Given the novel hands-on format of the workshop, we anticipate 20–35 participants—either as submitters or as plain players. We will send out a call for participation and advertise on the respective mailing lists for EUROVIS, ACM CHI, IEEE VIS, DRS, ACM DIS, Digital Humanities, Art+Design, Tableau, and social media (X, LinkedIn, etc.). The submitted extended abstracts will be peer-reviewed by at least two reviewers and one workshop organizer.

We plan on having an invited speaker to hold a keynote talk at the opening session of the workshop.

Fast-Forward: We ask the authors to create a 2-minute video that demonstrates the game mechanics, the number of players, the learning goals, the audience, etc. The fast-forward session will allow the workshop participants to obtain an overview of the available games and to decide which World Café table they want to join in the hands-on session. As we plan the workshop to be an on-site event, we ask the authors to present their games live within 2 minutes.

World Café Presentations: Selected submitted visualization games (submissions accepted in the form of a 1–2-page extended abstract) will be presented and discussed in a World Café setting. We plan to invite workshop participants to actively engage in and experience (i.e., play) data visualization games in small groups. During the World Café hands-on session, we plan to record videos intended for social media consumption and also for the reflection session. The hands-on session can be used to recruit test gamers and receive preliminary feedback on the game mechanics, etc.

Experiences during the hands-on session: To end the workshop, we will ask the authors to reflect on their experiences during the hands-on session. We also want to perform a structured discussion about further research directions (e.g., a repository for the collection/sharing of materials and ideas) in visualization games and build a sustainable community in these areas. After the workshop, a voluntary workshop lunch break will be planned to encourage community building.

4 TENTATIVE SCHEDULE

We are applying for a **half-day** workshop to be held on-site. The workshop will require a standard conference session room that can fit a maximum of 50 people, with sound, visual equipment, internet access, and preferably large tables and chairs that can be moved around for the World Café setting.

- 09:00 —09:10 **Opening & Fast Forwards/Lighting Talk**
- 09:10 —09:30 **Invited Speaker Keynote**
- 09:15 —9:40 **Fast Forwards**
- 9:40 —10:15 **Hands on Session #1**
- 10:15 —10:45 **Coffee Break**
- 10:45 —11:45 **Hands on Session #2**
- 11:45 —12:00 **Reflection and Closing**

5 WORKSHOP ORGANIZATION TIMELINE

The timeline for the workshop organization is as follows:

- January 20, 2025: **Call for Participation**
- March 14, 2025: **Submission Deadline for Extended Abstract**
- April 11, 2025: **Reviews Collected**
- April 16, 2025 (or before early registration): **Author Notification**
- May 2, 2025: **Camera-ready Submission**

6 INTENDED OUTCOMES & IMPACT OF THE WORKSHOP

This workshop will allow participants to discuss their challenges using visualization games for different purposes and change ideas or approaches with other visualization researchers from diverse fields. This will contribute to the agenda of the broader visualization community, literacy, education, storytelling, game designers, etc.

The interactive demo sessions on-site at the workshop provide an opportunity to recruit test players and gather initial feedback on the game's mechanics and other aspects.

We plan to develop an online repository summarizing the collected visualization games and pointers to external material, if available, to support newly appointed faculty in finding appropriate data visualization games for the intended audiences and goals.

7 ORGANIZING COMMITTEE

Christina Stoiber

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Christina is a researcher and lecturer at the St. Pölten University of Applied Sciences, Austria. Her research interests are Information Visualization, HCI, Usability, Visualization Education, and Visualization Literacy. She completed her dissertation on visualization literacy and onboarding in December 2023. She designed and conducted several workshops; most recently, she co-organized the IEEE VIS Workshop on Visualization Education, Literacy, and Activities [21,28]. She is also a certified examiner (SystemCert) for the UX-Development certificate based on ISO 17024.

Magdalena Boucher

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Magdalena Boucher is a junior researcher and lecturer at St. Pölten University of Applied Sciences, Austria. Her background is HCI and Game Animation and Illustration, and she has worked on multiple released games and children's apps. Currently, she is working on her PhD on enhancing visualization literacy through data comics. She is also a member of the Program Committee of the IEEE VIS Workshop on Visualization Education, Literacy, and Activities in Melbourne, Australia [21]

Victor Schetinger

Victor is a lecturer and researcher in Creative Computing at the St. Pölten University of Applied Sciences, Austria. He has a background in different forms of visual computing, from computer graphics and rendering to image processing and visualization. He is interested in different forms of inter- and transdisciplinary collaboration in research and is currently working with the human dimension of generative models. He has been involved with games and game research since being an undergrad and has both published within game literature and developed indie games in the past.

Victor-Adriel De-Jesus-Oliveira

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Victor-Adriel is a lecturer and researcher at the Institute of Creative Media Technologies, St. Pölten University of Applied Sciences. He is an expert in the field of Human-Computer Interaction, with a focus on Haptic Interaction and Computer-mediated Tactile Communication. He currently works on different research projects exploring situated data visualization, sonification of

wearable sensor data, and quantitative user experience, among other topics. He has published several papers in international journals and conferences within these areas. He also acts regularly as a reviewer for conferences and journals, as well as a member of the Program Committee of international conferences.

Velitchko Filipov

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Velitchko is a Postdoctoral researcher in the Visual Analytics research unit (CVAST) at the Institute of Visual Computing and Human-Centered Technology, TU Wien. He received his Ph.D. degree from TU Wien, Austria, in 2024 defending his thesis called "Networks in Time and Space: Visual Analytics of Dynamic Network Representations". His research interests include information visualization and visual analytics of dynamic graphs and networks focusing on novel representations and interactions.

Renata G. Raidou

<https://renataraidou.com/>
Renata is assistant professor in biomedical visualization and visual analytics at TU Wien, Austria. Her research direction is on the interface between visual analytics, image processing, and machine learning, with a strong focus on biomedical applications. A few years back, she became enthusiastic about the domain of data physicalization, and, in particular, its application to anatomical or biological education and edutainment. As part of this research direction, she also started investigating novel (biomedical) visualization educational approaches that comprise gamification.

Lorenzo Amabili

Lorenzo is a data scientist working in Buzzi's RTD team and an independent researcher in data visualization. His research interests are Visualization Education, Visual Storytelling, HCI, and Information Visualization. Currently, his main research efforts focus on the investigation and development of educational games and methods aiming to increase the visualization literacy of learners thanks to their engaging power based on gaming and storytelling elements.

Mandy Keck

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Mandy Keck is a professor in UX and Interaction Design at the University of Applied Sciences Upper Austria, Campus Hagenberg, Austria. Her research focuses on data visualization literacy, visual exploration, and interaction design. Mandy is responsible for eight courses on data visualization at the University of Applied Sciences Upper Austria that target different levels and audiences. She designed and conducted several hands-on workshops dealing with the creation of interface metaphors [22] and information visualizations [23] and was co-organizer of several conference workshops, including the IEEE VIS Datavis Activities workshops in 2020 and 2021 [18,19] and the IEEE EduVis Workshop on Visualization Education, Literacy, and Activities [21,28] in 2023 and 2024.

Wolfgang Aigner

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Wolfgang is professor at St. Pölten University of Applied Sciences, Austria and adjunct professor at TU Wien, Austria. His main research interests include visual analytics and information visualization with a focus on time-oriented data. Wolfgang has more than 20 years of experience in teaching and applying playful methods in visualization education and is the PI of the two research projects SEVA (<https://seva.fhstp.ac.at>) and Vis4Schools (<https://vis4schools.fhstp.ac.at>) that both focus on visualization literacy.

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