



D1.1: Handbook of co-creation methodologies

Version 1

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Abstract	This deliverable presents the OPENVERSE Handbook on Co-Creation Methodologies (V1)—a practical framework for organising, testing, and scaling co-creation in Virtual Worlds (VWs). Developed under WP1, it combines analytical research, expert input, and participatory experimentation through three co-creation workshops (two conducted, one scheduled) and forthcoming focus groups. The resulting OPENVERSE Toolkit of 48 tools, clustered along the Double Diamond process, enables collaborative innovation across sectors. The Handbook provides a clear and operational methodological guidance, and practical resources for organising, designing, facilitating, and evaluating co-creation activities in VWs, including detailed descriptions of tools, process frameworks, and examples drawn from the OPENVERSE co-creation workshops. The Handbook is conceived as a stand-alone, open-access resource, supporting inclusive, human-centred design and contributing to the EU's Web 4.0 vision for trustworthy, immersive digital ecosystems.
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* R: Document, report (excluding the periodic and final reports)

DEM: Demonstrator, pilot, prototype, plan designs

DEC: Websites, patents filing, press & media actions, videos, etc.

DATA: Data sets, microdata, etc.

DMP: Data management plan

ETHICS: Deliverables related to ethics issues.

SECURITY: Deliverables related to security issues

OTHER: Software, technical diagram, algorithms, models, etc.

EXECUTIVE SUMMARY

The **OPENVERSE Handbook on Co-Creation Methodologies (Version 1)** provides the first consolidated methodological framework for organising, executing, and evaluating co-creation activities within **Virtual Worlds** (VWs henceforth). Developed under **WP1 “Co-Creation of Open-Source Tools for the Virtual Worlds”**, it translates research insights into actionable guidance, enabling designers, researchers, developers, educators, and policymakers to conduct participatory innovation in immersive environments.

Grounded in European values of openness, inclusiveness, and trustworthiness, the Handbook defines co-creation as a collaborative, iterative, and human-centred process through which diverse actors collectively frame challenges and generate solutions.

It offers a structured, practice-based approach that combines analytical research, participatory experimentation, and iterative validation, following a **four-phase design-research cycle**:

Analysis: mapping and evaluating VWs and identifying 48 co-creation tools, clustered across the Double Diamond design process (Discover, Define, Develop, Deliver).

Expert survey: engaging domain professionals to prioritise relevant objects of co-creation across industries, ensuring real-world relevance of the toolkit.

Building the Handbook: designing, testing, and refining co-creation methodologies through three workshops that progressively validate tools, journeys, and full processes within VWs.

Focus groups (forthcoming): collecting feedback from industry experts to assess the market quality, usability, and innovation potential of the co-created outcomes.

This iterative process transformed the Handbook itself into a **co-created framework**, continuously tested and refined—thus inherently aligned with the participatory practices it promotes. Two workshops have already validated the toolkit’s adaptability and informed the structure, content, and user guidance of the Handbook; a third, forthcoming in autumn 2025, will test it in action for final refinement (Version 2). The **OPENVERSE Toolkit**, detailed in the annexes and hosted on Figma, serves as the Handbook’s operational backbone, providing 48 ready-to-use tools designed to support collaboration, creativity, and engagement in immersive settings.

The deliverable is structured into four interconnected parts:

Introduction – Presents objectives and conceptual grounding of the Handbook.

Methodology – Details the analytical process and experimentation steps through which the co-creation framework was elaborated.

Handbook – Provides the OPENVERSE co-creation framework, including design principles, guidelines, and descriptions of tools adapted to VWs.

Appendix – Contain supplementary resources, materials and workshop results referenced throughout the document.

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ABBREVIATIONS

D	Deliverable
DMP	Data Management Plan
T	Task
VW	Virtual World
WP	Work Package

1 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

The OPENVERSE Handbook on Co-Creation Methodologies (V1) constitutes the first consolidated version of the methodological framework designed to inform, structure, and support the organisation of co-creation activities within the context of Virtual Worlds (VWs). It provides the conceptual, procedural, and operational foundation for organising, replicating, and scaling participatory design experiments across a variety of EU sectors—e.g. education, culture, creative industries, fashion, manufacturing, design, technology, and entertainment—and within diverse digital environments.

1.1.1 Defining co-creation

Co-creation, as understood in OPENVERSE, refers to a **collaborative process in which users and organisations work together to generate concepts and solutions** that respond to shared challenges [1, 2]. Rather than treating users as passive recipients of innovation, co-creation engages them as active contributors whose situated knowledge, experiences, and creativity enrich the design process. As such, it represents a shift from designing *for* people to designing *with* them, acknowledging that innovation gains relevance and legitimacy when it incorporates the perspectives of those who will ultimately live with its outcomes. Organising co-creation is therefore a strategic approach to ensure that the results of any innovation processes are desirable, inclusive, and grounded in real needs. It provides the conditions under which individuals, communities, and relevant stakeholders can exchange perspectives, negotiate needs, and collectively shape the direction of innovation. In any setting, co-creation helps address complexity, balance expertise with lived experience, and mediate between divergent interests. Its strength lies in adaptability: it can be scaled and tailored to different scopes and maturities of innovation, provided careful attention is paid to *who* is involved, *when* engagement occurs, and *how* collaboration is facilitated. Ultimately, co-creation is recognised as one of the most effective approaches to inform, test, and scale innovation, ensuring that it is not only technically feasible but also ethically sound, and socially legitimate.

In line with this premise, co-creation is here understood as a collective, iterative, and reflective process in which diverse actors—users, designers, researchers, VWs consumers, producers, or citizens—jointly frame problems and generate solutions. Its strength lies in its adaptability: it can be implemented in almost any setting, provided that the *when*, *how*, and *with whom* of collaboration are carefully designed. Rather than prescribing a single model, the OPENVERSE framework provides guidance for tailoring co-creation to context-specific conditions, ensuring that participation is meaningful, inclusive, and oriented toward real innovation outcomes.

1.1.2 “From theory to practice” approach

The Handbook synthesises the outcomes of theoretical research, desk analysis, and field experimentation conducted under **WP1 “Co-creation of open-source tools for the Virtual Worlds”**, more specifically T1.3 “*Elaboration and implementation of co-creation methodologies*” and translates them into a structured set of principles, guidelines, and ready-to-use tools supporting the design and facilitation of co-creation processes within VWs.

The main objective of this deliverable is to define and test a **shared methodological language** for co-creation in VWs, enabling diverse actors—from creative industries to public administrations—to

collaboratively explore, design, and evaluate innovations within open, interoperable, and ethically grounded virtual environments.

Building on this premise, D1.1 “Handbook of co-creation methodologies” defines the methodological foundations through which OPENVERSE translates research insights into practical guidance for organising and steering co-creation activities in VWs. To do that, it:

- Systematises the results of theoretical and applied research carried out under WP1, combining conceptual analysis with empirical experimentation;
- Translates this knowledge into actionable principles and step-by-step guidelines for planning, running, and assess co-creation sessions in VWs;
- Documents the processes and findings of the first two co-creation workshops (performed in June 2025 and September 2025), which provided the initial validation of the OPENVERSE Toolkit and informed the design of this Handbook, laying the groundwork for their integration with the Technological Framework (WP5) and the OPENVERSE Observatory (WP6);
- Serves as a baseline for the final version of the Handbook (D1.2, M36), which will be refined and expanded following the third series of workshops devoted to co-creating innovation in VWs.

In short, D1.1 consolidates WP1 early theoretical, methodological, and practical contributions into a coherent framework aimed at enabling and supporting diverse actors—researchers, designers, developers, VWs consumers, and citizens—to approach and stage co-creation for exploring and shaping innovation within VWs as collaborative environments.

1.2 RELATION TO THE PROJECT AND CONCEPTUAL GROUNDING

WP1 acts as a starting point for translating research into action. It outputs a co-creation methodology with open-source tools that enable participatory innovation within VWs and feeds these assets into the project’s transversal components: the **Technological Framework** (WP5), the **Ethical and Governance Guidelines** (WP3), the **Foresight and Roadmapping activities** (WP2), and the **OPENVERSE Observatory** (WP6). Specifically, the cross-WP contributions from WP1 are:

- WP2: structured inputs—tool usage data, co-creation objects, and sectoral tags—to inform the Tech Radar, Marketplace, and Scenario development activities (T2.1, T2.2, T2.4).
- WP3: flags emerging ethical, legal, and IPR themes observed during workshops to support analysis in T3.4 and T3.5.
- WP5: shares requirements to inform T5.1, the Strategic Technology Agenda and D5.7.
- WP6: contributes to knowledge transfer and impact creation sharing by publishing the co-creation toolkit with its 48 tools, contributing to the observatory with WP1 outcomes (T6.2, T6.3).

The conceptual grounding of WP1—and D1.1 per extension—is aligned with the EU’s policy vision for VWs as outlined in the 2023 EC Communication [3, 4], the CERRE Issue Paper on *Defining Virtual Worlds* [5], and the JRC Science-for-Policy Report *Next Generation Virtual Worlds* [6]. Together, these documents frame VWs as **persistent, immersive, and interactive digital environments** able to blend physical and digital realities, creating unique opportunities for collaboration, creativity, and socio-economic activity. Yet, they also highlight challenges related to trust, governance, sustainability, and inclusion. WP1 approach responds to this dual purpose by positioning co-creation as both a **design practice** and a **policy instrument**: design, because it structures human-machine interaction, participatory prototyping, and value co-production in immersive settings; and policy, because it

operationalises EU values of openness, trustworthiness, and human-centric innovation through concrete design and participation processes.

The Handbook is therefore an OPENVERSE **contribution to the European VW ecosystem**, offering a framework that can be adopted or adapted by researchers, enterprises, public bodies, and educators seeking to conduct collaborative innovation in XR environments.

1.3 EVIDENCE BASE AND PROCESS

The OPENVERSE Handbook on Co-Creation Methodologies (V1 and later on V2) builds on the cumulative findings and results of the activities conducted under WP1 “Co-creation of Open-Source Tools for the Virtual Worlds”. It integrates analytical, empirical, and participatory evidence generated through Tasks 1.1, 1.2, and 1.3, which together establish the conceptual, methodological, and operational foundation of the Handbook.

The contributions of WP1 tasks/task outcomes to D1.1/this deliverable are explained in short below.

T1.1. Overview of existing Virtual World environments

It laid the conceptual and analytical groundwork for WP1. First, a systematic literature review was conducted to clarify the fragmented discussion of VWs and the frequent overlaps with Metaverse, clarifying the perimeter of action. The review synthesised academic and policy sources to align OPENVERSE’s understanding with the European Commission’s definition of VWs as persistent, immersive, and interactive environments enabling human presence and collaboration. As such, it established a robust and research-grounded definition of VWs, examining their socio-technical characteristics, experiential affordances, and potential relationships with co-creation and participatory innovation. Building on desk research, the team developed an **Analytical Framework** composed of nine dimensions—covering immersion, interaction, interoperability, economy, governance, accessibility, creator economy, openness, and privacy—plus a tenth dimension, sustainability, included qualitatively because of limited comparable data.

Second, a desk-based review and web scanning were performed to identify and analyse existing VWs as potential environments for experimentation. This mapping exercise resulted in an initial list of 118 platforms, which were then evaluated against the agreed EC-aligned definition. The process refined the list to 75 environments, which were assessed using the Analytical Framework developed. By applying this framework, the team generated a comparative analysis that led to a **shortlist of eight VWs**—*Engage VR*, *Arthur*, *Resonite*, *Fortnite*, *Spatial*, *Rec Room*, *VRChat*, and *Sansar*—selected for their technical maturity, creative potential, and alignment with EU values. These environments became the official **experimental arenas** for the OPENVERSE co-creation activities and the empirical foundation of the present Handbook.

T1.2. Calls for Participation in co-creation activities

It operationalised WP1’s participatory dimension by launching two calls: (1) the **Call for Participation**, targeting active users of the selected VWs and creative practitioners interested in experimenting with digital collaboration, and (2) the **Expression of Interest**, addressed to professionals, SMEs, and start-ups across sectors such as education, entertainment, and creative industries. The first call, the **Call for Participation**, targeted active users of the selected VWs, as well as creative practitioners, designers, and developers interested in exploring new modes of digital collaboration. It aimed to recruit participants for the three co-creation workshops foreseen under T1.3, ensuring balanced representation across gender, professional background, and VW familiarity. The second call, the

Expression of Interest, is designed to engage professionals, SMEs, and start-ups from sectors such as education, entertainment, fashion, culture, and digital innovation, as well as policy-makers and organisational leaders interested in the strategic use of VWs for business or public innovation. Rather than focusing on direct participation in the workshops, this call gathered experts willing to evaluate the outcomes of the co-creation activities in terms of usability, applicability, and market potential. The dissemination strategy combined institutional communication channels (project website, newsletters, and social media managed by WP4) with targeted outreach in user communities of each selected VWs—such as official Discord servers, Reddit forums, and Facebook groups. This approach enabled OPENVERSE to reach a broad and heterogeneous audience.

In T1.2, the most relevant online communities and official channels (Facebook groups, Discord servers, Reddit communities, LinkedIn, YouTube, Meta, Steam, Instagram, etc.) were identified. Where direct posting was possible, POLIMI made timed posts between 7–12 May 2025.

- Rec Room → 248,670 members
- Resonite → 12,612 members
- Sansar → 7,264 members
- Spatial → 59 members
- VRChat → 529,601 members
- For Engage VR, Arthur, and Fortnite posting was not allowed or channels were restricted

The call has currently secured a significant number of end users. Recruitment results and already engaged participants are as follows:

- **Total recruited across all platforms:** 176 non-unique users per platform
- Of which already engaged via **WS1:** 36 unique users
- Of which already engaged via **WS2:** 29 unique users

Table 1: Engagement per platform

Platform	Call for participation	Engaged via WS1	Engaged via WS2	Remaining to reach KPI
Engage VR	22	10	3	Reached
Arthur	10	4	1	5
Resonite	23	6	1	3
Fortnite	43	17	8	Reached
Spatial	44	29	2	Reached
Rec Room	26	7	3	Reached
VRChat	48	16	8	Reached
Sansar	15	5	1	4

This demonstrates that recruitment of the “10 users per platform” is being targeted and in progress, aiming at reaching the number in the upcoming co-creation activities when not met yet, mitigating the risk of insufficient creator interest.

Total recruited across all platforms via Expression of Interest: 58 users. Engage VR: 8; Arthur: 4; Resonite: 4; Fortnite: 13; Spatial: 9; Rec Room: 5; VRChat: 12; Sansar: 3.

T1.3. Elaboration and implementation of Co-Creation methodology

It constitutes the **core methodological pillar informing D1.1**. It aims to develop guidelines and tools for organising co-creation activities tailored to VW environments. The task is structured around four main activities: (i) the analysis of existing co-creation toolkits, leading to the selection of 48 tools mapped along the Double Diamond framework; (ii) the identification of objects for co-creation through an expert survey across OPENVERSE and partner networks; (iii) the execution of three co-creation workshops, which progressively test and refine the methodology; and (iv) a series of focus groups with industry experts, planned after each workshop to collect evaluative feedback on usability, quality, and innovation potential. The first two workshops—Co-Designing in Virtual Worlds for Boosting Innovation (9-13 June 2025) and Co-creating in Virtual Worlds, Eight Co-Creation Journeys Across Virtual Worlds (3 September 2025)—have directly informed this initial version of the Handbook. A third workshop, scheduled for autumn 2025, will focus on co-creating Innovation in VWs using the Handbook in action for validating it in practice and generating the empirical insights that will underpin D1.2 (final version of the Handbook). Detailed descriptions of each workshop—including objectives, participant profiles, and evaluation outcomes—are presented in the Methodology section below.

These three tasks as a whole inform D1.1 and provide it with a solid, multi-layered evidence base, which combines analytical mapping of environments, participatory recruitment and engagement, and iterative field experimentation.

1.4 HANDBOOK TARGET AUDIENCES AND EXPECTED IMPACT

The OPENVERSE Handbook on Co-Creation Methodologies addresses multiple communities engaged in designing, developing, and innovating within VWs. The following, non-exhaustive list outlines its primary target audiences and the value it brings to each:

- **Designers and design researchers**, who can rely on the Handbook as a structured framework for organising participatory design and experimentation in immersive environments, translating insights from the OPENVERSE Toolkit and workshops into replicable design practices;
- **SMEs, start-ups, and technology developers**, who can apply the open-source methodologies to involve users early in product and service development cycles, using VWs as living laboratories for co-creation, testing, and feedback;
- **Educators and trainers**, who can integrate the framework into design and technology curricula, adopting immersive co-design activities tested within the project to enhance experiential learning and teamwork;

Being the Handbook an adaptable and flexible set of tools, it could be adopted by secondary target audience as well:

- **Public sector innovators and policymakers**, who can adopt the co-creation guidelines to design and evaluate participatory and transparent decision-making processes, leveraging VWs to facilitate engagement and dialogue among citizens and institutions.

By providing open-source tools and validated methodologies, it responds to fundamental needs for **replication and scalability, interoperability and uptake of co-creation practices** across sectors. Its expected impact is thus twofold: (i) to strengthen the methodological literacy of European actors engaging with VWs, and (ii) to promote a shared culture of **open, ethical, and human-centric innovation** aligned with the EU's Web 4.0 vision.

2 METHODOLOGY

The methodological approach underpinning the OPENVERSE Handbook on Co-Creation Methodologies combines analytical research, participatory experimentation, and iterative validation. It builds on the cumulative results of WP1, following a design-research logic that alternates phases of **exploration, testing, and refinement**. It adopts a **practice-based, evidence-informed approach**, in which co-creation is studied, enacted, and progressively structured into an operational framework applicable across VWs. The process consists of four complementary phases:

- Phase 1. **Analysis**: mapping the ecosystem of VWs (T1.1) and identifying suitable co-creation tools (T1.3);
- Phase 2. **Expert Survey**: capturing cross-sector insights to inform relevant objects of co-creation (T1.3);
- Phase 3. **Building the Handbook**: testing and refining the methodology through three co-creation workshops (T1.3); and
- Phase 4. **Focus Groups**: collecting industry feedback on the innovation potential and market quality of co-created outcomes (T 1.3).

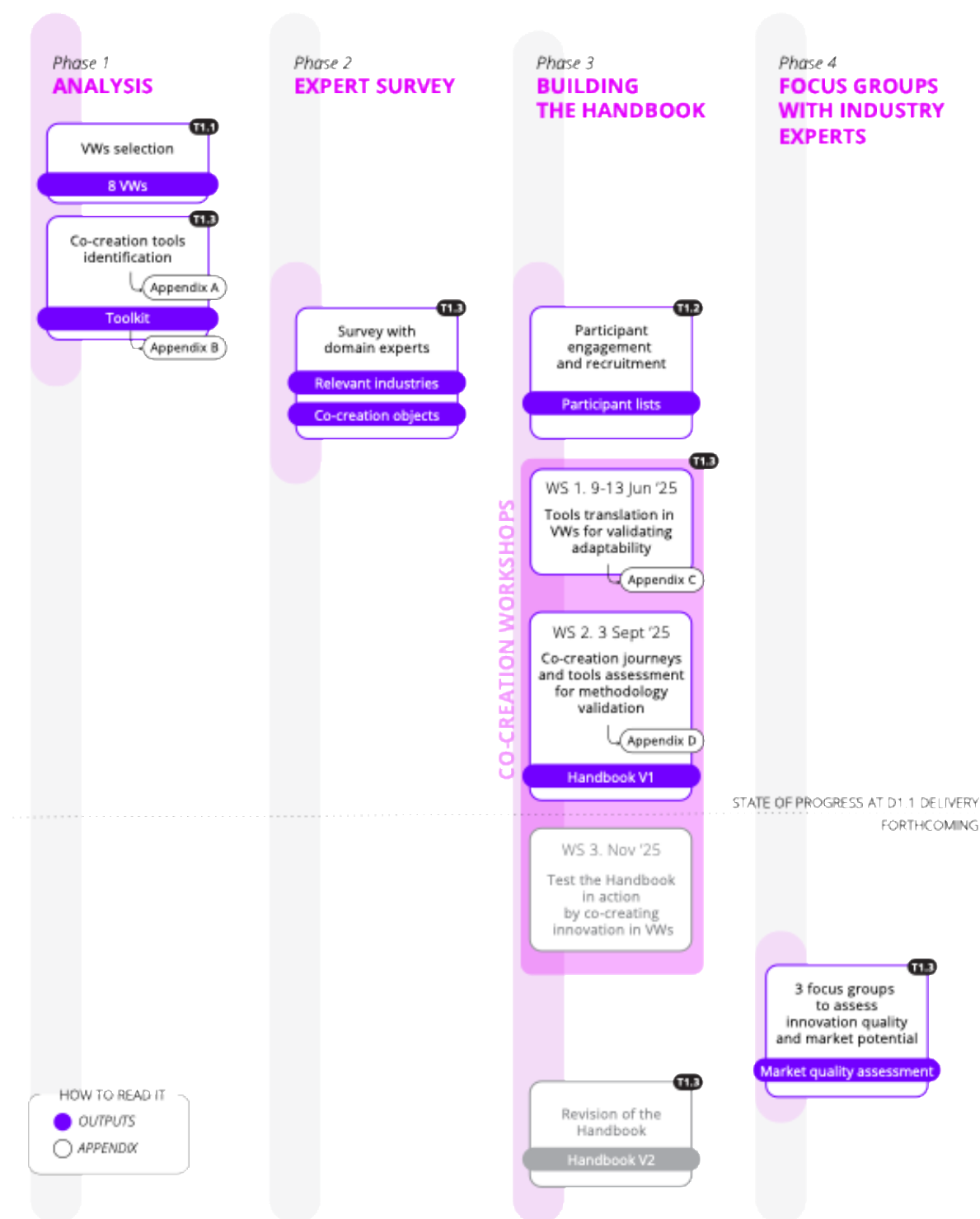


Figure 1: Methodology in terms of phases, activities, outputs and relation to appendices

Each phase is explained in the following paragraphs.

2.1 PHASE 1. ANALYSIS

This first phase had **two streams of research**, one focused on the **selection of VWs** and the other on the **identification of co-creation tools**. The aim was to establish both the *environments* and the *methods* for conducting co-creation in immersive settings, ensuring that the framework would be technically, socially, and methodologically robust.

2.1.1 VWs selection

The identification of VWs was conducted through an extensive **desk-based review and web scanning** of existing platforms. From an initial inventory of **118 VWs**, 75 were retained after validation against the European Commission's definition of VWs as *persistent, immersive, and interactive environments enabling human presence and collaboration*. Each platform was analysed using an Analytical Framework developed under T1.1. Through this framework, platforms were compared and ranked according to their affordances for co-creation and their alignment with EU values. This process led to the identification of 8 VWs selected for experimentation: *Engage VR*, *Arthur*, *Resonite*, *Fortnite*, *Spatial*, *Rec Room*, *VRChat*, and *Sansar*.

Methodologically, the selection sought to ensure complementarity across environments, representing different degrees of technological maturity, interaction modalities, and user community structures. To account for reach and engagement (Figure 2), the team adopted a distinction between absolute popularity, referring to platforms with a large, mainstream user base (e.g., Fortnite, VRChat); and targeted popularity, describing smaller but highly engaged niche audiences (e.g., Arthur, Resonite). This dual perspective ensured diversity across the sample and enabled experimentation in complementary settings, testing how varying affordances and audience structures influence co-creation processes.

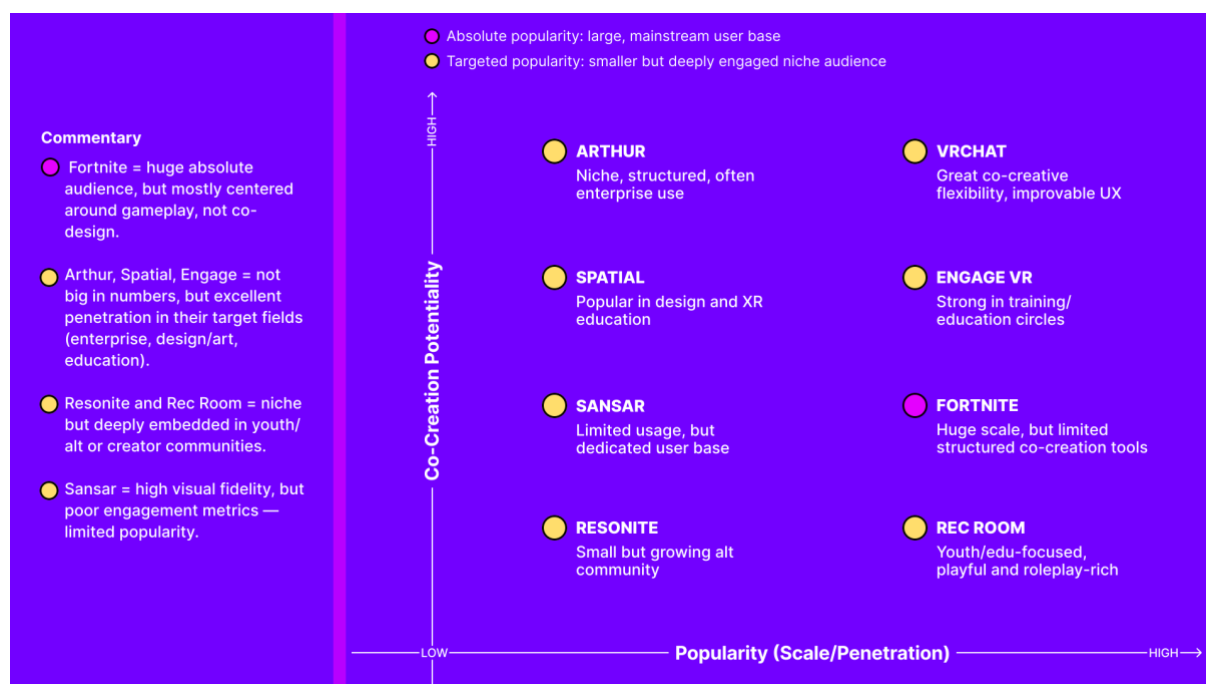


Figure 2: VWs according to co-creation potentialities and popularity

2.1.2 Co-creation tools identification

After the VWs analysis, a comprehensive tool-mapping exercise was conducted to develop a curated toolkit of co-creation tools tailored for use within VWs. Starting from **over 100 existing toolkits** and **167 individual tools**, a multi-criteria analysis was applied to evaluate each tool's potential for supporting immersive and collaborative design. Four relevance criteria—derived from literature and refined through internal testing—guided the selection:

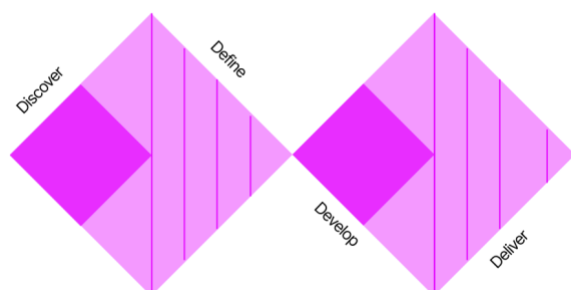
1. **Collaboration:** the tool's capacity to enable collective ideation and sense-making;
2. **Immersivity:** its ability to translate into embodied or spatial interaction;
3. **Adaptability to VW:** flexibility in different technological settings;
4. **Roleplay / Simulation fit:** suitability for behavioural enactment and experiential learning.

Each tool was qualitatively assessed for its strengths, contextual fit, and adaptability, and scored for relevance. This process led to the selection of **48 high-relevance tools**, clustered according to the four stages of the **Double Diamond framework**—*Discover, Define, Develop, Deliver* (Figure 3).

The **Double Diamond** (Design Council, 2005)¹ was chosen as the structuring model for its clarity, iterative nature, and proven applicability across design disciplines. Its division between divergent and convergent phases aligns naturally with co-creation processes, providing a consistent backbone for organising participatory activities and tool deployment.

Double Diamond

Design Council (2005)



DISCOVER

Conduct research and gather insights to deeply understand the problem space and uncover user needs and opportunities.

DEFINE

Analyze and synthesize the research findings to clearly articulate the core problem and create a focused design brief.

DEVELOP

Generate a range of ideas, build prototypes, and test solutions through iterative cycles to refine concepts.

DELIVER

Finalize the best solution, implement it, and prepare for launch while continuously testing and improving to ensure effectiveness.

Figure 3: Double Diamond framework and its phases (Design Council, 2005)—re-elaboration from Design Council original visual to align with OPENVERSE brand image

Following the clustering, each tool underwent an additional qualitative assessment to analyse its strengths and limitations in fostering collaboration and its suitability for digital and immersive co-design contexts. The outcome of this analysis—a refined, practice-oriented toolkit—supports both

¹ <https://www.designcouncil.org.uk/our-resources/the-double-diamond/>

the design and execution of immersive co-creation activities in VWs. Details on the selection methodology and full toolkit are provided in Appendix A and Appendix B.²

2.2 PHASE 2. EXPERT SURVEY

2.2.1 Identifying industries

To define the most relevant **industries** and **objects of co-creation** for VWs, the list was co-created during an **internal consortium workshop** held in Brussels on 6 March 2025, which brought together 16 consortium members representing diverse domains such as design, technology development, education, cultural heritage, and creative industries. During the session, participants completed a live survey administered via Wooclap, which served as an interactive tool to collect and visualise inputs in real time. The survey comprised 12 items—9 closed-ended questions and 3 open-ended responses. Closed items were measured using 5-point Likert scales to capture perceptions of relevance, maturity, and potential for co-creation within VWs. Open responses were thematically coded by two independent researchers, achieving an inter-coder reliability of $\kappa \geq 0.65$, ensuring consistency and validity in interpretation. This activity produced an initial list of **21 potential sectors**, reflecting a wide cross-section of European innovation ecosystems.

Building on this outcome, a questionnaire on Microsoft Forms was developed to gather external expert input and validate the sectoral scope. The survey targeted professionals with at least five years of domain experience, including designers, researchers, and practitioners active in innovation-related industries. Recruitment combined direct outreach by the WP1 team (81 direct invitations) and broader dissemination through the Big Data Value Association (BDVA), which circulated the invitation to its expert community through a dedicated newsletter, ensuring coverage across OPENVERSE partner networks and adjacent EU communities. The questionnaire invited respondents to provide their **professional information**, their **industry of activity** (from 21 predefined sectors, such as education, healthcare, fashion, manufacturing, and cultural heritage, with an open “Other” option), their **experience with Virtual Worlds** and the **specific platforms** they had previously used—8 VWs plus others. Respondents were also asked to identify **which kinds of objects they considered most relevant to co-create in VWs** and to express their interest in joining upcoming co-creation workshops.

The survey received 51 responses. While the survey achieved a high level of engagement and diversity in sectoral representation, some bias may stem from the composition of the recruitment channels. The direct invitations issued by the WP1 team reached a higher proportion of participants from design and innovation research backgrounds, whereas the BDVA dissemination brought in respondents with data, AI, and technology-oriented expertise. As a result, the sample reflects a balanced but still project-adjacent profile, with comparatively fewer participants from sectors outside the digital innovation ecosystem.

² **Appendix A** provides a detailed description of the **selection methodology** used to identify and assess co-creation tools and build the co-creation toolkit. It includes the evaluation framework, relevance criteria, scoring system, and qualitative assessment procedure adopted during the analysis phase. **APPENDIX B** presents the **complete OPENVERSE Toolkit**, containing the full set of 48 curated co-creation tools. Each tool is accompanied by its description, intended design phase (Discover, Define, Develop, Deliver), guidance for application and tailoring for VWs, and links to relevant resources for adaptation and use within VWs.

2.2.2 Typologies of co-creation objects

Survey results produced a **rich mapping of co-creation objects**, spanning digital products, interactive services, organisational workflows, community engagement models, and experiential content. Results identify four main **typologies of objects** that experts considered most relevant to co-create within VWs—**processes**, **services**, **digital artefacts**, and **physical artefacts**—reflecting the variety of applications and innovation practices across sectors:

- **Processes** (63 responses): These refer to organisational, collaborative, or creative workflows that can be reimaged or tested within VWs. Examples include participatory urban planning in smart cities, creative production pipelines in media and design industries, up to citizen engagement processes in public administration.
- **Services** (34 responses): Services relate to systems of interaction and value exchange between users and providers. In VWs, these can include training and learning experiences in education, remote interaction in healthcare, or customer engagement services in retail and tourism.
- **Digital artefacts** (31 responses): This category covers intangible products and interfaces such as app, data visualisations, virtual exhibitions, or interactive digital twins used for experimentation and co-design in domains like architecture, manufacturing, and cultural heritage.
- **Physical artefacts** (24 responses): These include tangible outputs whose design can be simulated or prototyped within VWs, such as furniture and space layouts in industrial design, wearables and accessories in healthcare and fashion, or mechanical components and prototypes in automotive and engineering sectors.

Together, these answers captured a **broad and cross-sectoral potential** of VWs for fostering participatory innovation. They demonstrate a varied interest in immersive environments as both **testbeds for co-creating new digital and physical artefacts** and as **collaborative spaces for redesigning processes and services** across industries.

This **bottom-up approach** captured sector-specific insights into what is most meaningful to co-create, recognising that innovation priorities differ widely across domains such as education, fashion, smart cities, cultural heritage, and entertainment—yet remain **transversally relevant** for the co-design of products, services, and processes.

These insights were instrumental in **tailoring the descriptions and relevance of the tools** within the OPENVERSE Toolkit, clarifying why each was included and how it can support different types of co-creation. The selected tools were refined to ensure **flexibility and adaptability**, enabling their application across varied industrial and organisational contexts.

Finally, the survey results were integrated into the **subsequent co-creation workshops**, ensuring that the experimentation was anchored in **real-world relevance**. Concrete examples of what to co-create and in which industry were integrated into Workshops 1 and 2 in different ways, serving as inspiration and orientation for participants. These examples helped them identify suitable innovation challenges and apply the toolkit meaningfully within their own domains. The following phase describes how this input was operationalised within the workshop activities.



Figure 4: Industries emerged from exploration with experts, and types of objects they would like to co-create in VWs, depending on their industry

2.3 PHASE 3. BUILDING THE HANDBOOK

The third phase focuses on **building the OPENVERSE Handbook on Co-Creation Methodologies**, grounded in the design, testing, and validation of co-creation activities across different VWs. It represents a core step in WP1's methodology, being where theoretical insights and analytical findings are translated into participatory experimentation.

The OPENVERSE Handbook on Co-Creation Methodologies is conceived as a **stand-alone document**, designed to be used independently and without requiring prior knowledge of the project. This approach ensures its accessibility and usability for a wide audience of designers, researchers, educators, VW consumers, and producers who may wish to apply its methods in their own contexts. By providing clear guidance, structured processes, and open resources, the Handbook is built to

enable readers to organise and conduct co-creation activities in VWs effectively, fostering wider adoption and transfer of the OPENVERSE approach across sectors and disciplines.

The three co-creation workshops—two completed at the time of writing (M24) and one forthcoming (M25)—have been instrumental in informing and shaping the Handbook. Each workshop acted both as an experimental environment and a feedback mechanism, enabling the iterative refinement of tools, procedures, and guidelines based on user experience. By engaging **diverse and complementary user communities**, relevant both as end-users and stakeholders, these workshops generated direct evidence of how co-creation unfolds in VWs and how methodologies and tools should adapt to different technical and social contexts.

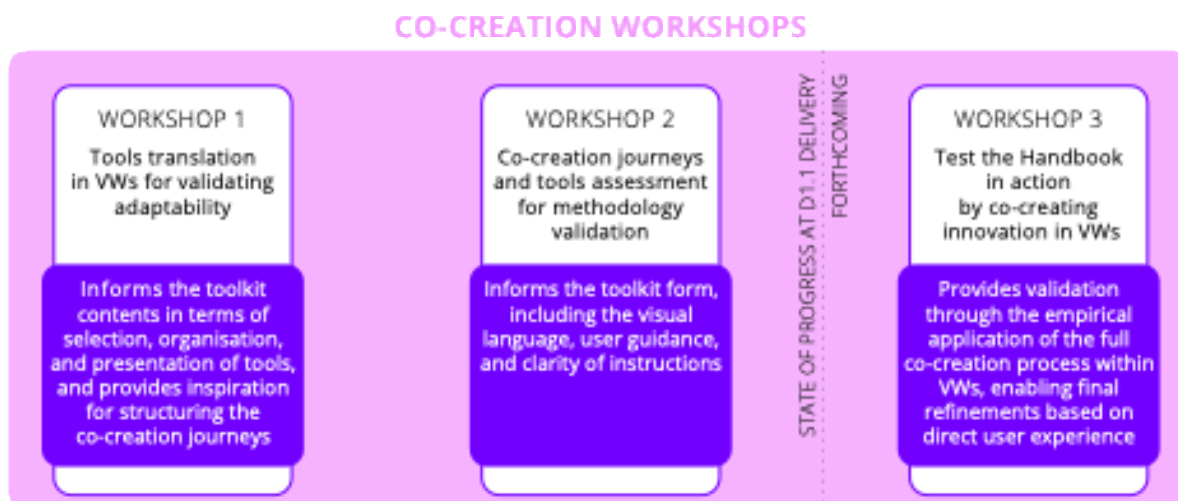


Figure 5: The 3 co-creation workshops and their outputs

2.3.1 Participant engagement and recruitment

Participants from both within and outside the selected VWs were invited to join the co-creation activities through the **open calls** launched under T1.2. The **Call for Participation** specifically targeted *active users* within and outside the selected 8 VWs, as well as individuals *interested in the intersection of technology and collaboration* and *eager to experiment with co-creation in immersive environments*.

The call was promoted through OPENVERSE's social media channels, across partners' community networks, and within the broader innovation ecosystem. To ensure wide outreach, it was also shared directly within VW user communities via Facebook groups, Discord servers, Reddit forums, and official communication channels. Each of the eight selected VWs hosts a well-established community of at least 20,000 active users, enabling the project to reach a diverse and representative audience. However, the extent of outreach varied, depending on the ability to post directly within each community and the availability of moderators to share OPENVERSE content on its behalf.

This open, multi-channel recruitment strategy involved both **experienced VW users and newcomers**, fostering an exchange of perspectives between early adopters and design-oriented participants. The approach allowed for creating a Handbook accessible to users with varying levels of expertise, reflecting the project's commitment to inclusiveness and openness of knowledge. The workshops thus became sort of living labs for the iterative construction of the Handbook between user experience, design research, and technology exploration.

2.3.2 Co-creation workshops

First co-creation workshop: “Co-Designing in Virtual Worlds for Boosting Innovation” (9–13 June 2025)

The first workshop marked the starting point for validating the OPENVERSE Toolkit and testing how co-creation tools could be effectively transferred into immersive environments. It brought together **36 design students** from Politecnico di Milano, enrolled in interaction and digital design courses but representing diverse disciplinary backgrounds, including service design, interaction design, communication, and strategic design. Conducted as a **five-day living lab**, the workshop combined conceptual learning, collaborative design, and hands-on experimentation in VWs.

Participants were introduced to the aim of the project and the co-creation focus, being provided with insights from the expert survey, which helped them select a domain of experimentation, an object of co-creation (e.g., service, process, artefact), and the VW best suited to support it. Building on this, they explored the Toolkit to identify relevant tools per each Double Diamond design phase, mapped the affordances of their chosen VW, and adapted the selected tool for immersive use. Through a process of **translation and prototyping**, participants designed and implemented working versions of co-creation tools directly inside the VWs, experimenting with spatial interaction, collaboration dynamics, and user engagement (Figure 6).

This activity enabled direct and continuous observation of how designers **appropriate, adapt, and operationalise co-creation tools** in immersive contexts, revealing both technical challenges and creative opportunities. The workshop confirmed the adaptability and relevance of the Toolkit, while also identifying the need for clearer instructions, contextual guidance, and visual support to help users feel empowered and autonomous in applying the methods. The insights gained provided the foundation for structuring and communicating the Handbook, shaping how tools are presented and explained so that the co-creation methodology remains accessible to users with different levels of expertise and familiarity with immersive technologies, and applicable across diverse VWs and industries.

See **Appendix c** for a full report of the first workshop and its results.

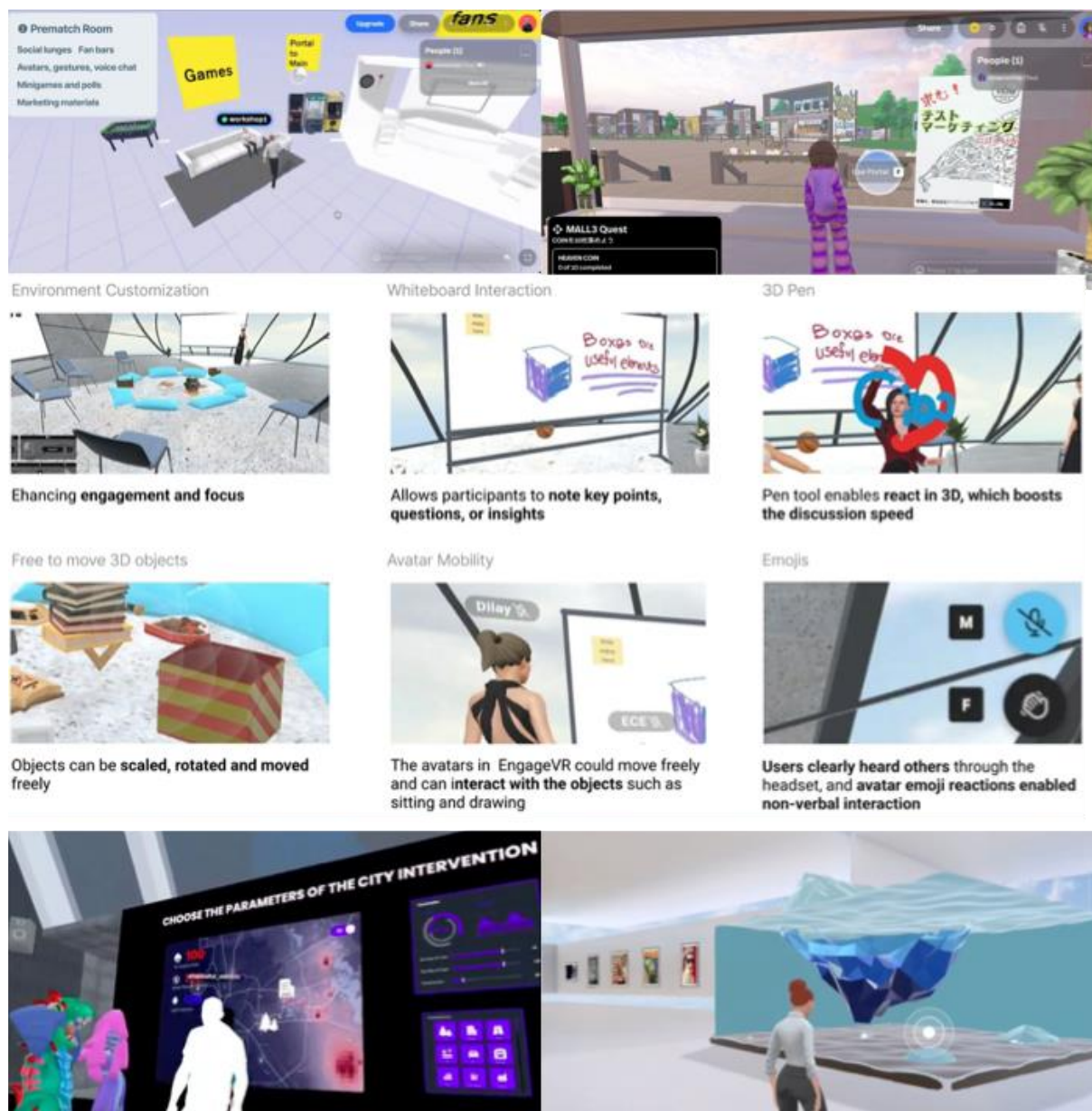


Figure 6: Screenshots of different co-creation tools re-enacted in VWs

Second Co-Creation Workshop: “Co-Creating in Virtual Worlds: Eight Co-Creation Journeys Across Virtual Worlds” (3 September 2025)

The second workshop extended the experimentation beyond individual tools, focusing instead on **co-creation journeys**—curated sequences of multiple tools arranged along the design process to demonstrate how they can be combined, used in practice, and with what outcomes. It involved **29 participants**, including XR practitioners, designers, and VW users with varying levels of experience in immersive collaboration.

For this iteration, participants were introduced to **eight distinct co-creation journeys** prepared by the research team—one for each VW—each combining tools aligned with the **Double Diamond phases**: Discover, Define, Develop, and Deliver. Participants collaboratively explored these journeys, assessing how different sets of tools could sustain end-to-end co-creation processes within their

respective environments. This approach enabled a **comparative assessment** across platforms and phases, addressing questions of **usability, engagement, and adaptability**. Participants were asked to evaluate each journey's capacity to enable meaningful participation, creativity, and outcome generation, as well as to discuss expected outputs and scalability.

The workshop's findings contributed directly to the **current version (V1) of the Handbook**, highlighting the need for: (i) Clear guidance on **when and how to deploy tools** within design phases; (ii) Flexible pathways that allow **combining tools into journeys**; and (iii) A focus on **replicability and transferability** across different industries and VWs.

The workshop also demonstrated the **importance of user diversity**—including varying levels of XR literacy and professional experience—in refining the accessibility and generalisability of the Handbook.

See **APPENDIX D** for a full report of the second workshop and its results.

Third Co-Creation Workshop: “Co-Creating Innovation in Virtual Worlds” (Forthcoming, Autumn 2025)

The forthcoming third workshop will **test the Handbook in action**, using it as the main reference for planning and conducting co-creation activities. Unlike the first two, this phase will focus on implementation and validation, gathering user feedback on the Handbook's clarity, structure, and practical effectiveness. The workshop will consist of a **series of sessions conducted across multiple VWs**, each addressing different **objects of co-creation and co-design**. The analysis of user experiences and outcomes, together with the feedback collected, will make it possible to evaluate how the Handbook performs as both a facilitation and learning tool for organising and running co-creation processes, and how it supports innovation from concept to outcome.

The feedback gathered will directly inform D1.2 (Version 2 of the Handbook), leading to a **refined and empirically validated framework** that integrates lessons learned from direct user application and real-world experimentation.

2.3.2.1 Integration into the Handbook: continuous feedback and cumulative learning

The insights from **Workshops 1 and 2** have been systematically incorporated into the **current version of the Handbook**, informing respectively its **content**—the selection, organisation, and presentation of tools, and the structure of co-creation journeys—and its **form**, including the visual language, user guidance, and clarity of instructions. **Workshop 3** will close the methodological loop, providing validation through **the empirical application of the full co-creation process within VWs**, enabling final refinements based on direct user experience.

This progressive and feedback-driven process has been strategic to ensure robustness and cumulative learning. Each workshop built upon the previous one, moving from the validation of individual tools (Workshop 1), to the testing of tool combinations and co-creation journeys (Workshop 2), and finally to the implementation of full co-creation and co-design processes within VWs (Workshop 3). This incremental approach created a continuous feedback loop, allowing for informed decisions at every stage and progressively enhancing the methodological framework

This iterative cycle has turned the development of the OPENVERSE Handbook into a co-created framework—one that is continuously tested, refined, and improved through the very participatory practices it promotes, while remaining open to ongoing feedback, observation, and the inclusion of diverse and complementary perspectives.

2.4 PHASE 4. FOCUS GROUPS WITH INDUSTRY EXPERTS

To assess the **innovation quality and market potential** of the outcomes generated through the co-creation workshops, **three focus groups with industry experts** are planned between the first and second release of the Handbook. These sessions will serve to evaluate the applicability, desirability, and scalability of the innovations co-created during the workshops, providing insights from professionals directly involved in relevant sectors.

Each focus group will review a set of co-created innovations, spanning different co-creation objects and use cases. The selection will aim to present a broad spectrum of applications, ranging from reconfigured service processes and participatory experiences to new digital products and collaborative workflows. By engaging experts from diverse industries—including design, technology, education, and public services—the sessions will ensure a multidimensional understanding of innovation potential in VWs.

The primary objective is to collect informed qualitative feedback on the market quality of co-created innovations, assessing their relevance, desirability, usability, transferability, and value creation, while also exploring how different sectors perceive the capacity of VWs to host meaningful and productive co-creation.

These discussions will close the methodological cycle, **bridging research-driven experimentation with market-oriented evaluation**. The outcomes will ensure that the OPENVERSE co-creation framework remains both academically grounded and industry-relevant, capable of supporting future innovation strategies that are inclusive, sustainable, and responsive to real-world needs.

3 DATA HANDLING, ETHICS, AND LICENSING

All research activities conducted under WP1 have been carried out in full compliance with the ethical standards of the European Commission and the OPENVERSE Data Management Plans (DMPs, in D7.3 and D7.7). The data collection processes associated with the toolkit development, expert survey, and co-creation workshops were designed to ensure lawfulness, transparency, and data minimisation, in accordance with the General Data Protection Regulation (GDPR – Regulation EU 2016/679).

3.1 LAWFUL BASIS AND CONSENT

All participants involved in the co-creation workshops and surveys provided informed consent prior to data collection. Consent templates were developed following the GDPR-compliant models included in D7.3 “Data Management Plan I”. Recruitment occurred through open calls published on the OPENVERSE website and shared via social media and professional networks, targeting adult participants (18+).

- The first workshop involved university students from Politecnico di Milano, School of Design, Digital and Interaction Design, who voluntarily enrolled as part of their academic coursework.
- The second workshop involved professionals and XR practitioners attending the EuroXR 2025 conference, where registration implied adult status and acceptance of participation terms.
- The third workshop, forthcoming in Autumn 2025, will engage professional and expert profiles, following the same GDPR-compliant procedures.

In all cases, participants were informed about the purpose of the study, the voluntary nature of participation, and their rights to withdraw at any time. No vulnerable groups were targeted, and no under-age participants were recruited.

3.2 DATA PROCESSING AND ANONYMISATION

Data collected during surveys, workshops, and desk research were processed in a **pseudonymised or aggregated form**, ensuring that no personal identifiers or community moderators’ information were stored or published. Only aggregate and anonymised data are reported in this deliverable and associated publications. An exception was made for the first Co-creation workshop (**Appendix c**), where participants developed creative outputs—such as adaptations of toolkit tools within VWs—that were credited to their design teams. In these specific cases, names were displayed alongside the work with explicit, written consent, acknowledging authorship and creative contribution. This practice is consistent with GDPR provisions on lawful processing based on consent and aligns with FAIR and open-science principles, which promote transparency, traceability, and appropriate attribution in co-creation and design research contexts.

The same approach will be followed for the third co-creation workshop, where participants will again engage in creative production and co-design activities in VWs whose outcomes warrant proper recognition and attribution of individual or team contributions, in accordance with the same ethical and legal standards.

All research data are stored securely in institutional repositories of Politecnico di Milano, following retention and access policies described in OPENVERSE Data Management Plan, in terms of storage and retention procedures. No sensitive personal data or behavioural tracking information were collected.

3.3 LICENSING AND INTELLECTUAL PROPERTY

The **OPENVERSE Handbook on Co-Creation Methodologies** and the associated **Toolkit** are distributed under the **Creative Commons Attribution–NonCommercial–ShareAlike 4.0 International (CC BY-NC-SA 4.0)** license. This open-access licensing model ensures that the materials may be **shared, adapted, and remixed** for non-commercial purposes, provided proper attribution is given and derivative works are distributed under the same or a compatible license.

Both resources have been designed to ensure **compliance with the licensing terms** of all referenced sources.

- **Adapted and Derivative Content (CC BY-NC-SA 4.0):** Tools and methodologies were directly adapted, remixed, or inspired by materials from the **AI4Gov Toolkit** and *Follow the Rabbit: A Field Guide to Systemic Design*, both under CC BY-NC-SA 4.0.
- **Inspirational Use Only (Non-Derivative):** Materials from *ServiceDesignTools*, *This is Service Design Doing – Method Library*, and *Share, Learn, Innovate!* were consulted for conceptual inspiration and structural guidance, but no derivative content was produced.

This approach ensures full respect of intellectual property rights and aligns with the **open-science and open-innovation principles** underpinning the OPENVERSE project. Both the Handbook and Toolkit will continue to be maintained under this license in future versions (D1.2), promoting open collaboration, transparency, and long-term reusability of results.

3.4 DATA RETENTION AND ACCESS

All datasets generated under WP1—including survey responses, workshop observations, and aggregated evaluation data—are securely stored and retained according to the DMP provisions outlined in the OPENVERSE DMP (initially D7.3, and then D7.7). Data will be preserved for a minimum of five years after project completion and made available for scientific and educational purposes under open conditions, unless restrictions apply due to third-party rights.

4 CONCLUSIONS

The **OPENVERSE Handbook on Co-Creation Methodologies (V1)** consolidates WP1's analytical, participatory, and experimental work into a practical, evidence-informed framework for designing and running co-creation in VWs. Grounded in **EU-aligned definitions of VWs** and structured by the **Double Diamond**, it translates theory into **actionable guidance**—tools, journeys, roles, and procedures—capable of being replicated and scaled across sectors. The two completed workshops validated individual tools and their application to end-to-end journeys, while the forthcoming third workshop will empirically apply the full process to finalize V2. The upcoming Workshop 3 and the final expert focus groups will close this rigorous loop of design, testing, and evaluation that ensures methodological robustness, usability, and market relevance.

Beyond method, the Handbook advances a **human-centric, ethical, and open approach to innovation**: it clarifies scope and expected outcomes, manages participant expectations, and promotes transparent, inclusive participation.

By interfacing with the project's transversal components and project activities (technology, ethics and governance, foresight, and observatory), it offers a coherent pathway **from research to practice**—supporting designers, producers, VWs consumers, researchers and educators to stage meaningful co-creation in XR. In doing so, OPENVERSE contributes a shared, open-source foundation for European actors to develop trustworthy, interoperable, and socially legitimate innovations in VWs—today with V1, and soon, with V2, refined by direct user application and industry feedback.

AI declaration. Artificial Intelligence (AI) tools were employed in the preparation of this deliverable solely for proofreading, language refinement, and accessibility enhancement, not for generating original content or research results. The use of AI-based proofreading support (LLM specifically) was particularly valuable given that the authors are non-native English speakers, ensuring improved linguistic clarity, consistency, and readability without altering the scientific meaning or interpretation of the content. In addition, LLMs were used for the creation of Alt Text descriptions of figures, in line with accessibility and FAIR communication principles. These AI-generated drafts were reviewed, edited, and finalised by the authors, who oversaw the entire process to ensure accuracy and coherence, while enhancing the deliverable's inclusiveness and clarity for diverse audiences.

HANDBOOK

This Handbook provides structured, narrative guidance for designing, executing, and evaluating co-creation workshops within Virtual Worlds (VWs henceforth), as developed in the OPENVERSE project. The goal is to empower a diverse range of stakeholders—designers, developers, educators, VWs consumers, and citizens—to run meaningful co-creation processes in immersive environments, using a shared methodology grounded in field experimentation and design research.

Rather than being a mere set of tools or best practices, this Handbook is conceived as a navigational aid: a framework that aligns the intentions of co-creation with the contextual affordances of specific VWs, the readiness of users, and the complexity of design challenges.

It draws from lessons learned during the first two OPENVERSE workshops, and it evolves as a living document to be refined through ongoing use and engagement.

1 DEFINING THE AIM OF CO-CREATION

Defining the aim of the co-creation workshop is the starting point, as it sets the foundation for all subsequent phases. This step involves identifying not only the general objectives of the activity but also aligning them with broader project goals, user needs, and the specific capabilities offered by VWs. A well-defined aim should articulate the transformation that the workshop intends to support and how it is intended to contribute to innovation: whether it is generating new ideas, solving a design challenge, validating concepts, or refining prototypes. In the context of VWs, this also means considering how immersion, presence, and embodiment can enhance participatory design—spanning from co-creation to co-design, and even co-production (Table 1Table 1).

Table 1: Comparative overview of Co-Creation, Co-Design, and Co-Production approaches, illustrating the different levels of user and organizational involvement in innovation processes. Adapted from Prahalad & Ramaswamy (2004), Sanders & Stappers (2008), and Ostrom (1996).

Co-Creation	Co-Design	Co-Production
Users & organizations collaborate for the creation of concepts for solutions. (Prahalad & Ramaswamy, 2004a)	Users & organizations shape the functional, aesthetic and experiential aspects of the solution. (Sanders & Stappers, 2008)	Users & organizations actively participate in the production and implementation of the solution. (Ostrom, 1996).
Elaborated from Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation.	Elaborated from Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design.	Elaborated from Ostrom, E. (1996). Crossing the great divide: Coproduction, synergy, and development.

Facilitators should reflect on what kind of knowledge or insight the co-creation session is expected to yield—be it user narratives, functional requirements, emotional responses, or socio-technical scenarios—and translate that into a concrete and focused objective. This clarity will not only help in selecting the appropriate tools and methods but will also guide the engagement of participants and the overall design of the session.

Every co-creation process must start with clarity: what are we trying to co-create, with whom, and for what purpose? Co-creation could be applied to reimagine products, services, or systems within selected industrial domains (e.g., education, entertainment, cultural heritage), and to explore how users can actively shape innovation in digital spaces.

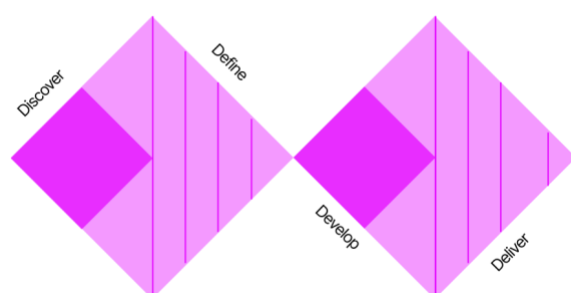
Key aspects to define at this stage include:

- **Object of co-creation:** Clearly define whether the focus is on a product, a service, an interaction model, or a conceptual prototype. This helps participants understand the scope and orient their contributions accordingly.
- **Sector/Industry:** Specify the domain in which the innovation is situated. This could range from healthcare to tourism, from cultural heritage to digital education. Understanding the context allows for the selection of relevant users and experts, and provides a lens through which the co-creation outcomes will be interpreted.

- **Expected outcomes:** Define what is anticipated as a result of the co-creation session—this might include user-generated insights, low-fidelity or high-fidelity prototypes, strategic frameworks, or multi-stakeholder agreements. Clarifying expected outcomes serves not only to inform the design of activities but also to define the scope of action and manage expectations, avoiding false assumptions about what the session can achieve and preventing later misunderstandings regarding the perceived impact of the co-created innovation.
- **Phases of the Double Diamond:** Position the workshop within the design process—whether it will support the Discover phase (identifying needs), Define (framing problems), Develop (generating solutions), or Deliver (testing and refining outcomes). This helps in selecting tools and setting an appropriate tone for the workshop (Figure 1).

Double Diamond

Design Council (2005)



DISCOVER

Conduct research and gather insights to deeply understand the problem space and uncover user needs and opportunities.

DEFINE

Analyze and synthesize the research findings to clearly articulate the core problem and create a focused design brief.

DEVELOP

Generate a range of ideas, build prototypes, and test solutions through iterative cycles to refine concepts.

DELIVER

Finalize the best solution, implement it, and prepare for launch while continuously testing and improving to ensure effectiveness.

Figure 1: Double Diamond framework and its phases (Design Council, 2005)—re-elaboration from Design Council original visual to align with OPENVERSE brand image

Establishing these elements early provides a strong backbone for the rest of the co-creation process. It ensures coherence, enables smooth planning, and maximises the relevance and impact of the workshop within the broader innovation journey.

2 SELECTING THE VIRTUAL WORLD (VW)

Choosing the right VW platform is a strategic decision that can significantly shape the outcome and experience of a co-creation workshop. This is not a neutral choice—each VW brings with it specific opportunities and constraints that will affect how participants interact, create, and collaborate. Just as a physical setting influences a design session, the digital environment can either amplify or hinder engagement, communication, possibility to participate, and thus innovate.

A well-matched VW should align with both the technical requirements of the session and the digital confidence of the participants. Different VWs provide varying levels of functionality: some offer spatial audio for realistic presence, others excel in avatar customization, shared whiteboards, 3D modelling tools, or the possibility to script and modify the environment itself. These affordances directly influence what can be imagined, shared, and co-developed during the workshop.

The selection process should begin with a careful evaluation of platform features in relation to the workshop's objectives. Facilitators must weigh several critical criteria, including:

- **Accessibility:** Can users easily enter the space from different devices or browsers? Are there barriers related to hardware, software, or bandwidth?
- **Interoperability:** Can the platform integrate or exchange data with other tools? Does it allow exporting or importing content?
- **Device compatibility:** Is the platform usable across desktops, mobile devices, or VR headsets?
- **Interface usability:** How intuitive is the user experience for both novice and advanced users?
- **Data privacy and security:** Does the platform comply with GDPR or other relevant data protection frameworks?
- **Moderation and control:** Can facilitators manage participant permissions, movement, and interactions effectively?
- **Collaboration modes:** Does the VW allow for both synchronous (real-time) and asynchronous (over time) collaboration?
- **Customisability:** How much flexibility is offered in terms of environment design, activity scripting, or interface adaptations?

The selection of VW should follow a multi-criteria evaluation framework, focusing on five core dimensions that reflect both design affordances and broader ethical concerns:

- **Affordance:** The extent to which the platform supports interaction, collaboration, embodiment, and creativity. Does it offer tools that allow participants to co-create in meaningful and expressive ways?
- **Agency:** The degree of control participants have over their environment and interaction modes. Can they shape the space, objects, or rules of engagement?
- **Co-creation maturity:** Whether the platform has embedded tools, templates, or user practices that already support ideation, prototyping, or collaborative problem-solving.
- **Community potential:** The scale and engagement of existing user communities, and the ability to tap into these for recruitment, feedback, or inspiration.
- **Ethical alignment:** The platform's adherence to European values around openness, data privacy, inclusivity, and non-discrimination. Does it provide a safe and welcoming space for diverse users?

Ultimately, the chosen VW becomes part of the workshop's design language—it will influence how participants feel immersed, empowered, and connected. A carefully selected platform can enhance

creativity, build trust, and foster richer, more impactful collaboration. Conversely, an ill-fitting environment may lead to confusion, disengagement, or exclusion. For these reasons, platform selection must be treated as a deliberate, iterative, and user-informed step in the co-creation planning process.

3 SELECTING AND ENGAGING PARTICIPANTS

Participant recruitment is one of the most delicate and impactful phases of any co-creation initiative. In **VWs**, this task requires thoughtful consideration of both technological readiness and human diversity. Participants are the **co-authors of the experience**: they shape ideas, surface hidden needs, challenge assumptions, and validate outcomes. Thus, their **selection and engagement must be strategic**.

The process begins with a clear understanding of the **desired participant profile**. This includes **demographic diversity**—age, gender, geographic origin, language—as well as **experiential diversity**, involving individuals with varying degrees of familiarity with VWs and co-design practices. For instance, including a **mix of expert users, domain specialists, and citizens** with lived experience relevant to the workshop topic can produce richer, more grounded insights.

To ensure transparency and compliance, every **Call for Participation** must integrate a **Privacy Statement** and a **Data Processing Notice**, clearly explaining how personal information (e.g., name, contact details, affiliation) will be stored, processed, and used in accordance with EU GDPR Regulation (2016/679). In OPENVERSE, a [Call for Participation](#) has been created, **integrating all information related to the [Privacy Statement and Data Processing](#)** in compliance with EU GDPR regulations.

Participants must provide **explicit consent** before being contacted or enrolled. The call should include a short paragraph such as:

“All personal data collected through this form will be processed by Politecnico di Milano (project coordinator) exclusively for the purposes of participant selection, communication, and organisation of co-creation workshops within the OPENVERSE project. Data will be stored securely and deleted after project completion, in compliance with the EU General Data Protection Regulation (GDPR).”

The Call for Participation should be **precise yet inspiring**, highlighting the co-creative nature of the activity, the participant’s role, and the tangible or intangible outcomes they may help shape. It should specify the **topic of the workshop**, the **duration and format (in-person, online, or in-VW)**, the **technical requirements** (e.g., headset, platform account), and the **expected commitment** (number of sessions, approximate time).

Example excerpt for a Call for Participation:

We invite designers, developers, educators, and Virtual World users to join the OPENVERSE co-creation workshops—collaborative sessions exploring how immersive environments can support innovation across sectors. Participants will work in interdisciplinary teams to prototype ideas and test co-design tools directly within selected Virtual Worlds. The activity requires no previous experience in VR; guidance and onboarding will be provided. Selected participants will receive a participation certificate and will be acknowledged in project dissemination outputs.



OpenVerse

Call for Participants!

Co-Creation Workshops
in/for Virtual Worlds

Apply Here!

A Workshop to innovate in Virtual Worlds

Each workshop offers hands-on experimentation for Capacity Building on co-creating innovation in Virtual Worlds.

Join us to engage with new tools for developing mock-ups and prototypes tailored to diverse sectors including cultural and creative industries, healthcare and tourism, and more.

Who should Apply?

- Active users of one or more of these Virtual Worlds: Engage VR, Arthur, Resonite, Spatial, Rec Room, VRChat, Fortnite, and Sansar.
- People interested in the intersection of collaboration and technology.
- People eager to discover new ways to experiment in Virtual Worlds.

Figure 2: Example of Call for Participation

Subject: OPENVERSE Co-Creation Workshop – Confirmation and Scheduling

Dear [Name],

Thank you for expressing your interest in participating in the OPENVERSE co-creation workshops. We are now scheduling the upcoming session dedicated to [topic/Virtual World name]. The workshop will take place on [proposed date(s)] and will last approximately [X hours].

Please confirm your availability by replying to this message or by selecting a preferred slot using the following link: [Insert link to Doodle, Teams, or scheduling tool].

Further details, including access instructions, privacy information, and technical requirements, will be shared after your confirmation. Should you have any questions, please don't hesitate to contact us at [email address].

We look forward to co-creating with you!

Kind regards,

The OPENVERSE Team

Subject: Reminder: OPENVERSE Co-creation Workshop | Cast your preference for picking the date!



Hi!

Thanks for expressing your interest in participating in the OPENVERSE Co-creation Workshop!

We're reaching out because we are defining the best time for the workshop, and we are doing it collectively with the participants.

Just a quick reminder: the workshop will last 4h and focus on co-creating in Virtual Worlds, experimenting with a set of tools developed within the OpenVerse project.

*Please select your availability via this Doodle link:
<https://doodle.com/meeting/organize/id/aKE5RNzd>*

Then, if you'd like to invite other Virtual World users to join, feel free to share this with them!

They just need to register via our Call for Participation form and indicate their availability.

*Register via Call for Participation:
<https://open-verse.eu/call-for-participation-co-creation-in-for-virtual-worlds/>*

*Indicate availability via Doodle:
<https://doodle.com/meeting/organize/id/aKE5RNzd>*

We look forward to co-creating with you soon!

Best from OPENVERSE!

Inclusion in VWs requires **additional sensitivity**: not all participants may be digitally confident, and some may experience fatigue or disorientation in immersive environments. For this reason, engagement efforts should start **well before the workshop**. **Personalized invitations** that clearly communicate the purpose and relevance of the activity are more effective than generic call-outs. These messages should explain not only **what is expected**, but also **what is offered**: participants should understand the **value of their time and contributions**, whether it's the opportunity to influence innovation, gain visibility, learn new tools, or network with peers.

Since co-creation is not just about one session, **engagement should be sustained**. Share the **outcomes of the workshop**, **thank participants explicitly**, and show them **how their input was used**. This not only respects their contributions but also encourages future participation.

In such activities, participants are not treated as test subjects, but as **active co-designers**. Their insights, emotions, and creativity are integral to the innovation process. Ensuring a **transparent, respectful, and well-supported recruitment and engagement strategy** is therefore not just a logistical task—it is the **foundation of any meaningful co-creation process in VWs**.

4 PLANNING THE WORKSHOP

Careful and intentional planning is the backbone of a successful co-creation workshop, especially when it unfolds within the layered and often unfamiliar terrain of VWs. This phase is not only about logistics and scheduling but about designing an activity that is coherent, inclusive, and meaningful—one that maximizes participants' contributions while minimizing technical or cognitive friction.

Planning begins with a deep understanding of the goals and desired outcomes of the workshop. These objectives should guide every subsequent decision, from the structuring of the session to the choice of tools and the way participants are onboarded. The methodology is grounded in the Double Diamond framework—Discover, Define, Develop, Deliver—which supports a dynamic interplay between divergent thinking (opening up to possibilities) and convergent thinking (focusing on specific directions).

A core component of planning is the **selection and contextual adaptation of co-creation tools**. The OPENVERSE Toolkit includes a wide variety of such tools—a **curated set of 48 co-creation tools** mapped across the four phases of the Double Diamond—that support everything from early exploration to final decision-making (Figure 3 and Figure 4).

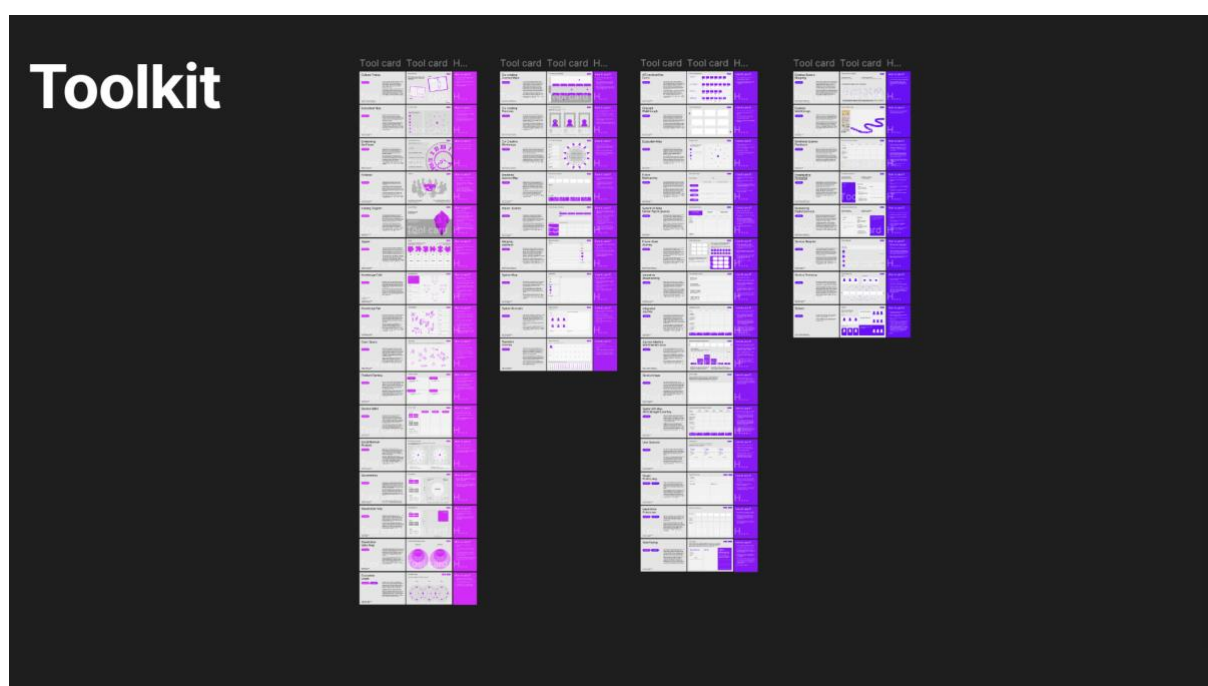


Figure 3: Overview of the Toolkit, showing the full set of 48 curated co-creation tools organised by design phase. The figure provides a visual summary of the toolkit's composition

48 Tools

in 4 DD phases

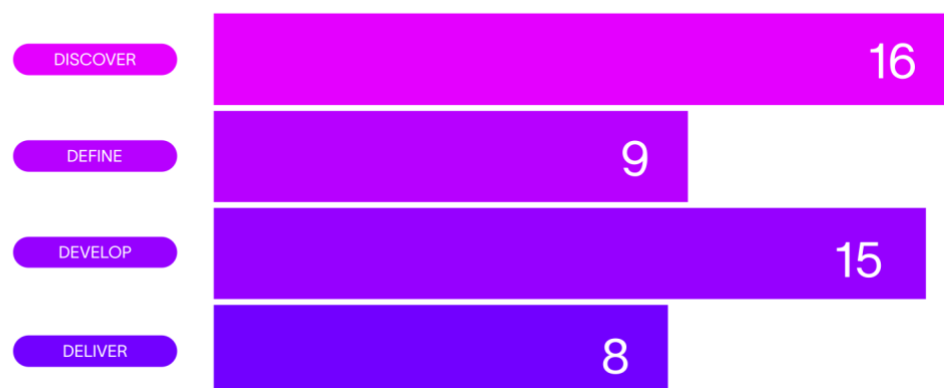


Figure 4: Distribution of the 48 co-creation tools across the four phases of the Double Diamond framework of Discover, Define, Develop, Deliver

For example, empathy maps, journey maps, and moodboards may be used in the Discover phase to understand needs and desires; while persona definition, stakeholder mapping, or how-might-we questions help sharpen focus in Define. The Develop phase might engage participants through speculative scenarios, creative prototyping, or experience mapping; and in the Deliver phase, participants might be asked to validate outcomes, prioritize solutions, or articulate roadmaps for implementation.

In a VWs, however, these tools must be adapted to a new spatial and embodied context. Facilitators must ask: What does it mean to co-create when people are not physically co-present? How can traditional design tools be reimagined for immersive, interactive, and often gamified environments? For each selected tool, careful thought must go into how participants will access and interact with it: Will they move through different spatial zones in the VW? Will they manipulate objects, collaborate on shared boards, or speak with avatars in real time? Will they work synchronously or asynchronously? These are not trivial considerations. They shape the rhythm of the session and the quality of the insights generated.

Equally essential is the definition and preparation of supporting tools that enable the workshop's smooth execution. These may include **presentation templates** (e.g., PowerPoint or Keynote) for visual framing and step-by-step guidance; **communication and conferencing platforms** such as **Microsoft Teams or Zoom**, used to coordinate participants, manage timing, and facilitate access to the VW; and **breakout rooms**, which can host parallel group discussions or focused activities. In addition, **collaborative design environments**—such as **Miro, Mural, or Figma**—serve as digital whiteboards for capturing ideas, visualizing progress, and documenting co-created content in real time. The selection of these tools should align with the workshop's objectives, the participants' digital literacy, and the degree of immersion desired. Ensuring consistency between these layers (presentation, communication, and collaboration) helps maintain flow and reduces cognitive load during transitions between activities.

Planning also includes designing the overall **journey of the workshop**—what happens when, for how long, and how participants move from one phase to the next. This should not be rigid but it must be intentional. Transitions between activities and spaces should be smooth, with built-in opportunities for reflection, feedback, and reorientation. Time should be allocated for divergent activities (idea

generation, brainstorming, exploration) and convergent activities (evaluation, synthesis, decision-making). Consider embedding short pauses, social moments, or energizers to maintain engagement and avoid fatigue, especially in longer sessions.

Equally important is the **definition of facilitation roles**. Who will lead the discussion? Who will monitor technical issues? Who will document outcomes in real time? In VWs, facilitation takes on a new dimension: facilitators must guide not only the intellectual process of co-creation but also help participants navigate the virtual environment.

Once the agenda is set and the tools are prepared, participants should receive **clear, concise communication** that explains what the session will involve, how they should prepare, and what they can expect to experience. This includes detailed instructions for accessing the VW platform, account setup, avatar creation, and basic navigation. If possible, consider organizing a short onboarding session or creating a video tutorial in advance to reduce friction and boost confidence.

In sum, **workshop planning in a VWs context is about orchestrating complexity**. It involves balancing creative freedom with structured guidance, embracing the affordances of digital immersion while accommodating real-world user diversity.

5 EXECUTING THE WORKSHOP

The **execution phase** is where the co-creation workshop comes to life; it demands flexibility, attentiveness, and a deep sensitivity to both the tools and the participants involved. It begins with a warm welcome and an introductory moment in which the facilitator clearly outlines the **session's objectives** and offers a roadmap for the experience ahead. Participants are then guided through each stage of the co-creation process, structured around the **Double Diamond framework**: Discover, Define, Develop, Deliver.

Facilitators assume a pivotal role in this phase—not as controllers but as enablers of participation. Their responsibility is to create a **safe and generative atmosphere** where conversation can flow, misunderstandings can be clarified, and inclusivity is actively upheld. Rather than driving outcomes, they support the emergence of insights and collaboration through thoughtful moderation and responsive engagement.

During the workshop, participants engage in **hands-on activities** using the co-creation tools selected during the planning phase. These tools—mapped to the relevant stage of the design process—might include empathy mapping exercises, collaborative storytelling, speculative scenario building, prioritization boards, or interactive voting mechanisms. Each activity is designed to foster creativity and structure at once, encouraging participants to externalize their ideas and work toward **tangible, shareable results**.

Facilitators must be prepared to **adapt activities in real time** based on group dynamics, participant energy, or technical constraints. Such flexibility is not only expected—it is **fundamental to the spirit of co-creation in Virtual Worlds**. What matters most is maintaining momentum, connection, and a shared sense of purpose.

Documentation plays an essential role throughout the session. Visual materials such as screenshots, whiteboard exports, and video recordings (with prior consent) should be systematically captured. In parallel, facilitators may collect reflections via chat logs, embedded surveys, or short interviews. These outputs provide a record of the workshop and serve as rich sources for **post-event analysis, evaluation, and dissemination**.

As the workshop draws to a close, it is important to dedicate space for a **meaningful conclusion**. Closing rituals—such as a collective reflection, a shared takeaway, or an emotional check-out—offer participants the opportunity to process what they experienced. This reflective closure also contributes to a sense of **ownership and shared accomplishment among** participants.

Even in the absence of a final deliverable or prototype, the session should end with a **tangible outcome** that represents the group's collaborative effort. What matters is not just the output but the participatory process through which it was created.

Ultimately, the execution of a co-creation workshop in a VW is a **performative act of coordination, care, and collective creativity**. When carried out with intention and responsiveness, this phase transforms participation into agency—and imagination into actionable insight.

6 SHARING RESULTS AND SUSTAINING ENGAGEMENT

After the workshop concludes, the co-creation process continues—sometimes in subtler but equally critical ways. One of the most important post-workshop responsibilities is the **documentation and sharing of results**. These outcomes must be captured in formats that are clear, accurate, and **accessible for different audiences**. This could involve detailed summaries, visual maps, concept outlines, speculative scenarios, design briefs, or digital prototypes. Where appropriate, these materials should be translated into multimedia formats to make them more inclusive and compelling.

Sharing should serve a **dual function**. Internally, it helps project teams reflect on outcomes and align future steps. Externally, it contributes to **transparency** and opens the process to critique, learning, and potential reuse. However, all dissemination must respect **privacy, ethical guidelines**, and the expectations set with participants during the recruitment and consent process.

Beyond dissemination, a critical task is to **sustain engagement**. Participants should not feel that their contribution was limited to a one-off event. Recognition and appreciation play a vital role: simple gestures like thank-you messages, digital badges, or public acknowledgments can validate their involvement. Even more impactful is the opportunity for **continued participation**, such as testing prototypes, offering feedback, or co-authoring dissemination outputs.

In longer-term projects, it is helpful to establish **dedicated channels for ongoing communication**—for instance, a Discord or Slack channel, or a newsletter that keeps participants connected. These tools nurture a sense of belonging to a design journey that evolves over time.

Ultimately, sustaining engagement means affirming that participants' **time, ideas, and experiences have value**—not only in shaping specific workshop outcomes but in influencing how innovation unfolds over time. The **conclusion of a co-creation workshop** should therefore be framed not as an endpoint, but as the **beginning of a broader conversation**. By intentionally sharing results and nurturing ongoing relationships, facilitators and project leads embed co-creation into the wider ecology of innovation, enabling **collective learning** and **sustainable participation**.

7 FINAL REMARKS

Co-creation in VWs is not simply about using new technologies; it's about unlocking **new modes of collective imagination, collaboration, and design**. These immersive spaces allow us to **reframe participation** by engaging users not just as informants, but as **co-designers of futures**. The process is complex, and it demands care: care for **accessibility, inclusivity, technical fluency, and social dynamics**.

This **Handbook** offers a starting point, but **co-creation remains an evolving practice**. Each session brings new insights, and each participant reshapes the process. Embrace uncertainty, nurture connections, and let the Virtual World amplify what people can imagine—and build—together.

This Handbook is intended not as a fixed manual, but as a **companion to experimentation**. Its structure reflects both **theoretical grounding** and **practical validation**, and it remains **open to change**. As **VWs evolve and new actors enter the field**, co-creation will need to adapt—to **new tools, new ethics, and new ambitions**.

This Handbook invites **stakeholders to use, adapt, and expand this methodology**, contributing to a shared European vision of **inclusive, responsible, and human-centric innovation** in immersive environments.

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APPENDIX A. METHODOLOGY FOR THE SELECTION AND EVALUATION OF CO-CREATION TOOLS

This appendix presents the **methodology developed within T1.3** to create a **curated toolkit of co-creation tools** tailored for use within Virtual Worlds (VWs, henceforth). The activity was designed to provide a robust empirical and methodological foundation for the **OPENVERSE Handbook on Co-Creation Methodologies**, representing its first step in translating theoretical research and desk analysis into actionable design instruments.

As immersive digital environments become increasingly relevant for participatory innovation, there is a growing need for **tools and guidance that effectively support collaborative design practices** in such contexts. Addressing this need requires accommodating a **broad diversity of users and settings**, spanning different levels of expertise in co-creation and design, as well as the heterogeneous backgrounds of participants. Recognising this diversity informed the **conceptual framework of the scoping exercise**, guiding the selection of tools that could adapt to multiple user profiles, collaboration modes, and application domains. This framing shaped the methodological choices described below and clarified the purpose of the scoping activity: to identify, analyse, and assemble a toolkit capable of supporting **meaningful and inclusive co-creation** across a wide range of immersive environments.

1 OBJECTIVE AND OVERALL APPROACH

The objective is to **develop a systematic process for identifying, evaluating, and selecting co-creation tools** suitable for application within VVs. The goal is to build a **robust, practice-oriented toolkit** that supports the design and implementation of **collaborative and immersive co-creation activities** in digital environments.

The process articulates through a **structured approach of 7 phases (described in the methodology paragraph)** aimed at:

1. **Scoping and collecting** existing design and co-creation toolkits relevant to participatory innovation;
2. **Analysing** these toolkits against predefined inclusion criteria—English language, presence of actionable tools or guidelines (rather than purely conceptual descriptions), open-access availability, and direct relevance to co-creation;
3. **Extracting and cataloguing** individual tools according to defined attributes and design phases; and
4. **Evaluating** the tools using four relevance criteria: **collaboration, immersivity, adaptability to VVs, and roleplay/simulation fit.**

Drawing on over 100 initial toolkits and more than 160 individual tools, this process resulted in the selection of 48 high-relevance tools. These were organised within the four stages of the Double Diamond design process—Discover, Define, Develop, and Deliver—ensuring comprehensive coverage of the design cycle, with several tools applicable to more than one phase.

The qualitative evaluation focused on assessing each tool's relevance for co-creation purposes, analysing how effectively it could enable collaboration, engagement, and shared value creation in immersive contexts. This appendix reports on the scientific methodology adopted for this process, which followed a transparent and replicable approach to ensure the validity and reliability of the resulting toolkit.

The resulting OPENVERSE Toolkit serves as a practical resource to support the design and facilitation of co-creation activities in VVs. It enables digital collaboration, fosters user engagement, and facilitates the exploration of new ideas and solutions within immersive, interactive environments.

This toolkit thus constitutes the starting point for the development of the OPENVERSE Handbook, serving as its empirical and methodological backbone. Its validation and refinement are being carried out through the co-creation workshops conducted under Task 1.3, which assess how the selected tools perform in real co-creation scenarios within VVs and inform their contextual adaptation and further methodological evolution.

2 METHODOLOGY

The creation of the curated OPENVERSE Toolkit unfolded through a series of structured phases, each aimed at systematically identifying, assessing, and selecting service design and co-creation tools suitable for application within VVs. The process combined desk research, content analysis, and qualitative evaluation to ensure both methodological rigour and practical usability.

2.1 PHASE 1. TOOLKITS SCOPING

The first phase consisted of a **comprehensive scoping of existing toolkits and repositories** relevant to co-creation and service design. These repositories served as key sources of knowledge and inspiration, offering diverse methodological perspectives that could be transferred or adapted to immersive contexts. Among the most significant repositories analysed were those developed by **IDEO, Service Design Tools, SISCODE Learning Hub, AI4Gov, Nesta, and AIXDESIGN**, among others. Drawing on such a broad base ensured a robust foundation upon which to curate a reusable portfolio, capturing a wide spectrum of design and innovation knowledge.

Each toolkit was documented within a structured dataset including the following fields:

- **Nr:** Unique progressive identifier;
- **Toolkit:** Title or name;
- **Publisher:** Organisation or entity responsible for publication;
- **Description:** Concise summary of content and purpose;
- **Link:** URL providing public access.

A total of **110 toolkits** were initially scoped, entering a preliminary selection phase, forming the basis of a comprehensive evaluation structured around three criteria:

- **Language:** The linguistic accessibility of the toolkit, including the languages in which it was available. Only those in the English language were considered.
- **Presence of tools:** presence of tangible tools rather than abstract methodologies or processes, addressing the demand for practical instruments to foster the involvement of users across the process.
- **Open access:** The extent to which the toolkit was freely accessible to the public, ensuring that no significant barriers to entry (such as cost) were present.

Toolkits that met the inclusion criteria across all three dimensions underwent a **qualitative analysis** to assess their **relevance for co-creation**. This analysis involved an in-depth review of each toolkit's design and content, with particular attention to its potential contribution to co-creation practices in VVs. The evaluation was framed within the broader context of **service design theory and practice**, ensuring conceptual consistency and methodological robustness.

The results of this analysis were documented through (i) narrative comments, outlining the relevance of each toolkit in the context of co-creation, and (ii) a synthetic relevance score (High, Medium, Low/None). These records captured both the strengths and limitations of the toolkits, offering critical reflections on their capacity to facilitate collaborative design processes. Based on these findings, a refined subset of toolkits—those demonstrating a high and medium degree of co-creation relevance—was established and carried forward for deeper examination in subsequent research.

phases. This focused selection provided the foundation for identifying the most effective tools to support co-creation within VWs.

2.2 PHASE 2. TOOLS SCOPING

In the second phase, the selected toolkits were **analysed per individual tool**, catalogued each tool in a dedicated dataset capturing the following attributes:

- ID: A unique identifier for the tool;
- Toolkit: Name of the source toolkit;
- Publisher: Organisation or entity responsible for the creation and publication of the tool;
- Tool name: The specific name of the tool;
- Purpose: A concise description of intended use;
- Description: A detailed explanation of the tool features and application;
- Link: URL for access;
- Reference: Source or foundational reference.

This systematic cataloguing provided an organised overview of each tool's nature and characteristics, clarifying its function within broader service-design and co-creation contexts. Five toolkits were selected for in-depth analysis:

- [AI4Gov Toolkit](#) (CC BY-NC-SA 4.0),
- [Follow the Rabbit: A Field Guide to Systemic Design](#) (CC BY-NC-SA 4.0),
- [Servicedesigntools](#) (CC BY-NC-ND 2.5),
- [This is Service Design Doing – Method Library](#) (copyrighted content), and
- [Share, Learn, Innovate!](#) (copyrighted content)

From these toolkits 167 individual tools were selected for subsequent evaluation.

2.3 PHASE 3. RELEVANCE CRITERIA

To establish a hierarchy of relevance for informing the inclusion in the toolkit, four **relevance criteria** were defined, drawing from existing literature and refined through expert discussion.

Table 1: Relevance criteria used for informing the inclusion of tools in the toolkit

Criterion	Descriptor	Reference
Collaboration	This criterion assessed the tool's capacity for facilitating simultaneous, active participation from multiple users. A score from 0 to 5 was awarded based on how effectively the tool supported collaborative interactions among users.	• Comas, J., & Tschang, F. T. (2013) • Davis, A., Murphy, J., Owens, D., Khazanchi, D., & Zigurs, I. (2009) • Dionisio, J. D. N., III, & Gilbert, R. (2013) • Girvan, C. (2018) • Reis, R., Escudeiro, P., & Escudeiro, N. (2010).
Immersivity	This evaluated whether the tool leveraged visual, spatial, or interactive elements—particularly in 3D or shared spaces—that could enhance user engagement. A score from 0 to 5 was assigned based on the tool's immersive qualities and its ability to create an engaging	• Ball, M. (2022) • Kataria, S., Kedia, A. K., & Ravindran, V. (2023) • Ng, D. T. K. (2022) • Slater, M., & Sanchez-Vives, M. V. (2016) • Zhang, X., Chen, Y., Hu, L., & Wang, Y. (2022)

	environment.	
Adaptability to Virtual Worlds	This criterion examined the tool's effectiveness in virtual environments, specifically assessing whether the tool could be seamlessly applied or adapted for use within virtual worlds. A score from 0 to 5 was given based on its flexibility in virtual contexts.	• Dionisio, J. D. N., III, & Gilbert, R. (2013) • Giang Barrera, K., & Shah, D. (2023) • Lim, W. Y. B., Xiong, Z., Niyato, D., Cao, X., Miao, C., Sun, S., & Yang, Q. (2023) • Mourtzis, D., Panopoulos, N., Angelopoulos, J., Wang, B., & Wang, L. (2022) • Nevelsteen, K. J. L. (2018)
Roleplay /Simulation Fit	This dimension evaluated whether the tool could benefit from the incorporation of avatars, scenario-based play, or storytelling techniques. A score from 0 to 5 was assigned based on how well the tool could be enriched by these interactive or performative elements.	• Akchelov, E., & Galanina, E. (2016) • Askar, H., Darwish, A., & Hassanien, A. E. (2023) • Bartle, R. (2003) • Russell, S., & Creighton, O. (2011)

Each tool was scored on a **0–5 scale per criterion**, with a **maximum total score of 20**, to quantitatively assess its potential for immersive co-creation. Together, these criteria assessed interaction quality, user engagement potential, and contextual flexibility, allowing transparent comparison across tools.

2.4 PHASE 4. DOUBLE DIAMOND PHASE CLUSTERISATION

Following the evaluation based on the relevance criteria, the selected tools were manually clustered into the four phases of the Double Diamond design framework (Design Council, 2005). Developed by the Design Council, this model is widely recognised for structuring design thinking through four iterative stages: Discover, Define, Develop, and Deliver. Each phase supports distinct yet interconnected parts of the innovation process, ensuring that divergent and convergent thinking are both adequately represented in the toolkit.

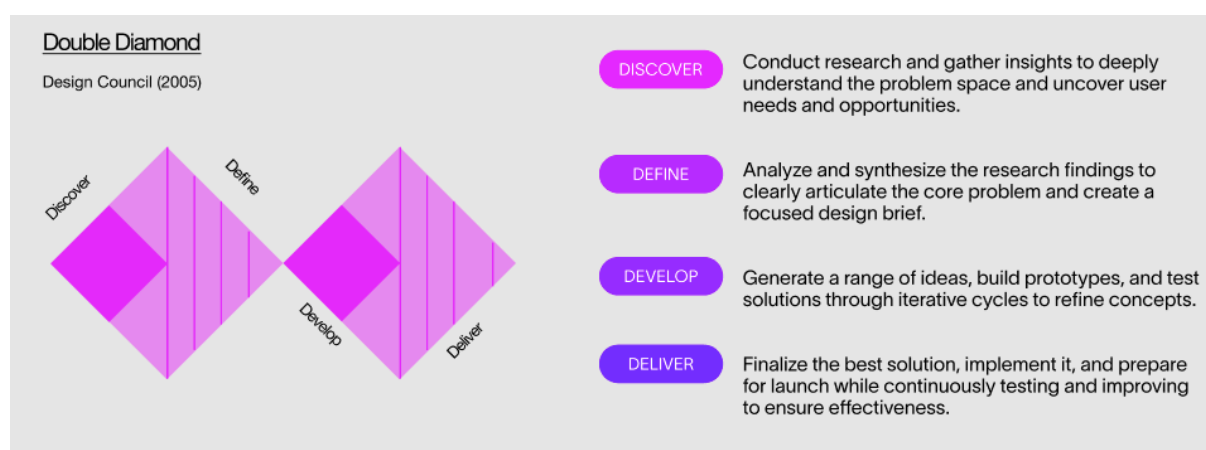


Figure 1: Double Diamond framework and its phases (Design Council, 2005)—re-elaboration from Design Council original visual to align with OPENVERSE brand image

Each phase and reference to the amount of tools associated in this phase are summarised below.

Table 2: Design phase, their description, and typology of tools associated

Phase	Descriptor	Typology of tools associated
Discover Phase	The Discover phase focuses on exploration and understanding the problem space. It is characterised by divergent thinking and open investigation, where design teams gather insights, conduct research, and immerse themselves in the context of the problem. The purpose of this phase is to identify challenges and opportunities before narrowing the focus for later stages.	A total of 59 tools were associated with the Discover phase. These tools typically support user research, observation, contextual analysis, and problem framing, enabling a comprehensive understanding of the issues at hand. They help design teams investigate user needs, capture environmental and behavioural data, and build empathy with stakeholders—activities that are fundamental for establishing the foundations of co-creation in both physical and virtual environments.
Define Phase	The Define phase aims to synthesise and clarify the problem identified during the Discover phase. This step involves distilling insights, identifying key patterns, and refining the scope of the challenge to ensure a focused and well-framed design direction. It is a transitional phase in which collected data are translated into structured insights and actionable problem statements.	A total of 40 tools were mapped to the Define phase. These tools are primarily dedicated to problem structuring, insight mapping, conceptual framing, and prioritisation. They help participants transform research findings into shared understanding, making explicit the relationships between user needs, contextual factors, and design opportunities. Within the co-creation process, such tools enable teams to collaboratively define project goals, align perspectives, and establish a clear foundation for ideation and prototyping.
Develop Phase	The Develop phase is centred on ideation and the generation of potential solutions. This stage encourages exploration, experimentation, and iteration. Participants create, test, and refine early ideas, translating insights into tangible concepts. It is marked by collaborative creativity and rapid prototyping, allowing teams to test multiple alternatives before converging on the most promising ones.	A total of 45 tools were associated with the Develop phase. These tools support brainstorming, concept development, scenario building, and prototyping, promoting creativity and experimentation. They are particularly relevant for immersive and participatory environments, where collaborative exploration and visualisation can be enhanced through spatial interaction, roleplay, and simulation. By supporting iteration and co-creation in shared digital spaces, these tools foster engagement, creativity, and collective sense-making.
Deliver Phase	The Deliver phase focuses on implementation, validation, and evaluation. It involves refining prototypes, scaling solutions, and ensuring that final outcomes meet design objectives and user expectations. This phase emphasises testing, learning, and improvement, marking the convergence of the design process from concept to realised outcome.	A total of 26 tools were allocated to the Deliver phase. These tools support testing, validation, delivery, and evaluation activities, guiding teams through pilot implementation and outcome measurement. Within co-creation processes, they enable participants to assess the feasibility and impact of designed solutions, incorporate user feedback, and ensure that outputs are both practical and meaningful. Their inclusion strengthens the toolkit's capacity to sustain co-creation throughout the entire design cycle—from initial exploration to tangible results.

2.5 PHASE 5. QUALITATIVE EVALUATION

Following the clustering phase, each tool underwent an **in-depth qualitative assessment** to determine its relevance for co-creation within VWs. The evaluation was conducted using a five-point scale (1 = none; 5 = high) across four key criteria: **collaboration, immersivity, adaptability to context, and roleplay/simulation fit**. In addition to the numerical scoring, evaluators provided narrative notes detailing each tool's strengths and limitations in fostering collaborative and participatory design practices, with reference to the same evaluation criteria.

This qualitative layer ensured a holistic understanding of each tool's potential, complementing quantitative scores and revealing contextual nuances that influence its applicability within digital and virtual settings.

2.6 PHASE 6. TOOLS SELECTION

Following the qualitative assessment, the **final selection of tools** was based on their relevance scores and qualitative evaluations. Only tools achieving a **total score above 15** were considered for inclusion in the curated set. Particular weight was given to tools excelling in key dimensions:

- Tools with **the highest score (5) in Adaptability to VWs** were prioritised, as they demonstrated the strongest potential for effective application within digital and virtual environments.
- Tools that achieved a **high score (4 to 5) in Collaboration** were also given significant consideration, reflecting their proven capacity to support active, simultaneous user participation.

As a result of this process, the tools were **reviewed, confirmed, and re-allocated** across the four phases of the Double Diamond design framework as follows:

- Discover: 16 tools
- Define: 9 tools
- Develop: 15 tools
- Deliver: 8 tools

This selection ensured that the final toolkit encompassed methods not only relevant to co-creation but also demonstrating the highest potential for collaborative use across the different phases of the design process within VWs.

APPENDIX B. THE OPENVERSE TOOLKIT

Appendix B presents the **complete OPENVERSE Toolkit**, hosted on **Figma**, which contains the full set of **48 curated co-creation tools** identified through the methodology described in **Appendix A**.

Each tool entry includes:

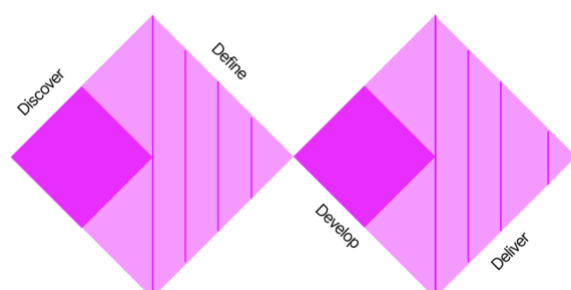
- a concise **description** of its purpose and use;
- its **corresponding design phase** within the Double Diamond framework (Discover, Define, Develop, Deliver);
- **guidance for application** and **tailoring to VWs**; and
- links to relevant **resources and references** for adaptation and implementation within immersive environments.

The Toolkit will become openly accessible via Figma.

This resource is designed as a **living, open-access collection**, enabling designers, researchers, and practitioners to apply, adapt, and expand the use of co-creation methods in VWs, fostering collaboration, innovation, and inclusivity in immersive design practices.

Double Diamond

Design Council (2005)



DISCOVER

Conduct research and gather insights to deeply understand the problem space and uncover user needs and opportunities.

DEFINE

Analyze and synthesize the research findings to clearly articulate the core problem and create a focused design brief.

DEVELOP

Generate a range of ideas, build prototypes, and test solutions through iterative cycles to refine concepts.

DELIVER

Finalize the best solution, implement it, and prepare for launch while continuously testing and improving to ensure effectiveness.

Figure 1: Double Diamond framework and its phases (Design Council, 2005)—re-elaboration from Design Council original visual to align with OPENVERSE brand image

48 Tools

in 4 DD phases

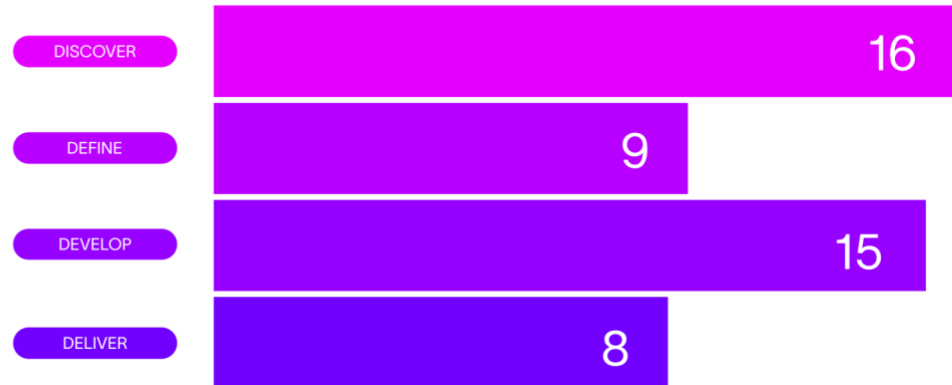


Figure 2: Distribution of the 48 co-creation tools across the four phases of the Double Diamond framework of Discover, Define, Develop, Deliver

Tools

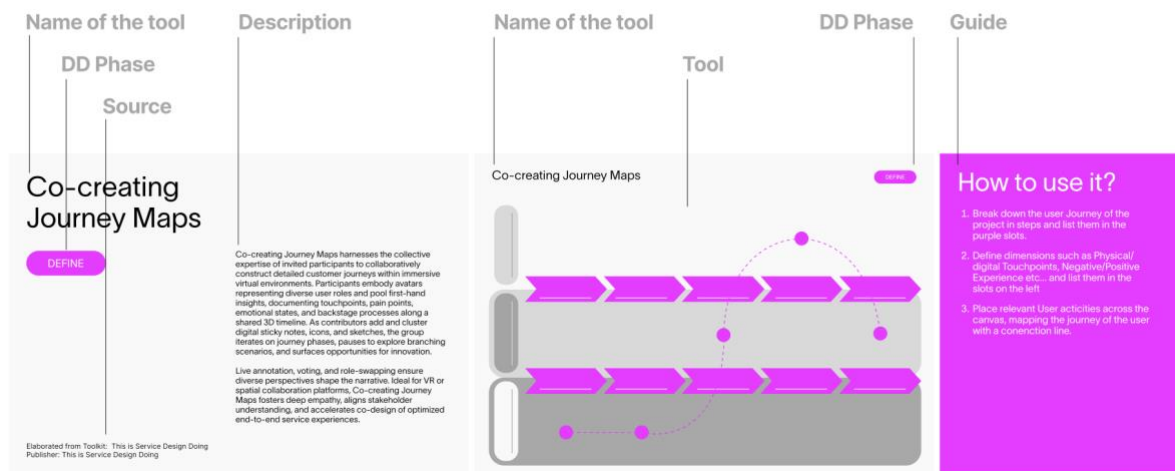


Figure 3: Template of the Toolkit tools, illustrated with the example “Co-creating Journey Maps.” Each tool card follows a consistent structure including name, description, source, Double Diamond phase, visual diagram, and a practical “How to use it” guide

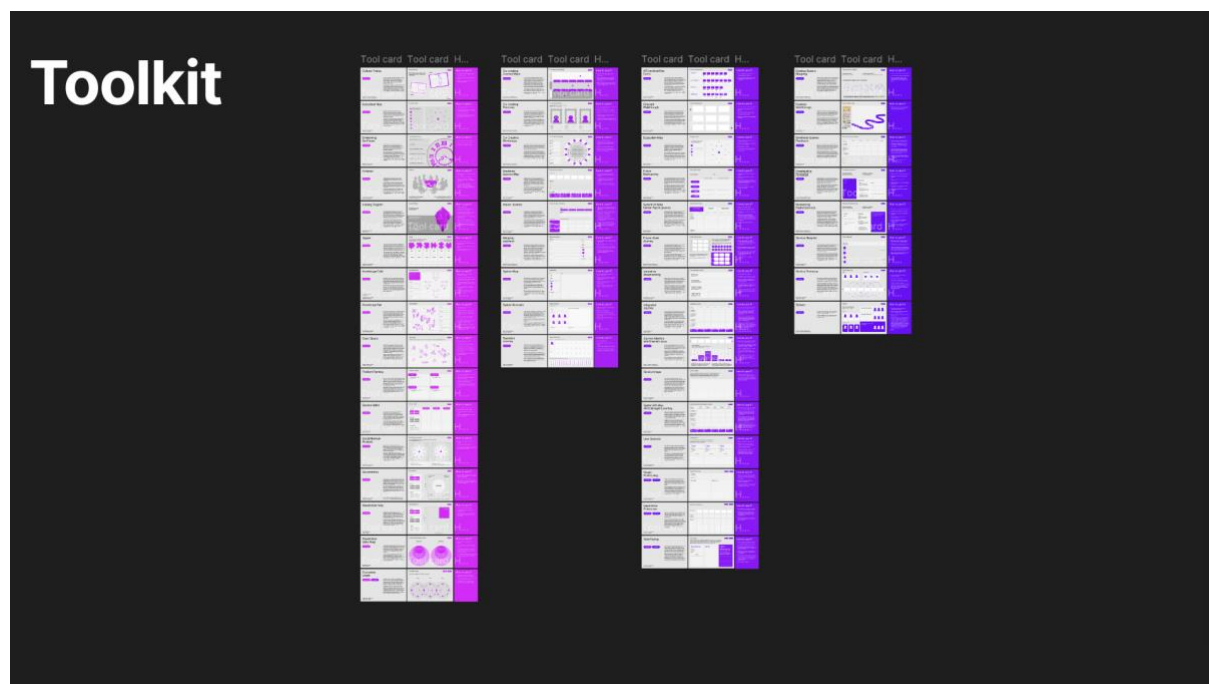


Figure 4: Overview of the Toolkit, showing the full set of 48 curated co-creation tools organised by design phase. The figure provides a visual summary of the toolkit's composition

APPENDIX C. REPORT ON THE FIRST CO-CREATION WORKSHOP “CO-DESIGNING IN VIRTUAL WORLDS FOR BOOSTING INNOVATION”

Report on the Co-Creation Workshop “Co-designing in Virtual Worlds for boosting innovation”

9-13 June 2025

T1.3 Elaboration and implementation of co-creation methodologies

Author: POLIMI

EXECUTIVE SUMMARY

As part of the OPENVERSE project’s field-testing phase, a five-day intensive co-creation workshop titled “Co-Designing in Virtual Worlds for Boosting Innovation” was conducted at the Politecnico di Milano School of Design from June 9–13, 2025. The initiative aimed to explore how immersive environments can enhance collaborative innovation across traditional and emerging industries. The workshop brought together a selected cohort of 36 designers in training currently enrolled in a Master of Science at the School of Design, Politecnico di Milano. Participants have multidisciplinary backgrounds—spanning service design, UX, fashion, immersive media, and strategic design. Notably, all participants were also active users of Virtual Worlds (VWs), offering a valuable dual perspective as both designers and native users of immersive environments.

Seven interdisciplinary teams engaged in a structured design sprint, using VWs as experimental platforms to test and adapt co-creation methodologies. Each group selected an industry challenge (e.g., education, fashion, sports, urban planning), identified a co-creation object (e.g., service, process, or experience), and translated one co-creation tool from the OPENVERSE Toolkit—comprising 48 tools based on the Double Diamond framework—into a VW environment. Platforms tested included Spatial, EngageVR, VRChat, and Unity, among others.

The report presents the workshop structure, its process and resources, and the outcomes of the workshop, as seven immersive prototypes of co-creation tools for VWs. Below an outline of the domain, focus, and tool translated in the virtual environments.

1. Sports – Designing co-watching football experiences in Spatial using “Service Prototyping”.
2. Fashion – Role-playing techwear testing in Unity and Spatial through “Investigative Rehearsal”.
3. Marketing – Enabling knowledge exchange via “Knowledge Fair” in Spatial.
4. Adult Entertainment – Exploring ethical design through avatar-based “Investigative Rehearsal” in VRChat.
5. Museums – Co-designing emotional visitor journeys in Spatial with the “Iceberg Diagram”.
6. Education – Language learning in EngageVR using “Fishbowl” structured dialogues.
7. Smart Cities – Simulating policy planning through “Investigative Rehearsal” in Spatial.

The translated tools demonstrated how immersive affordances—such as spatial narrative, embodiment, symbolic interaction, and scenario chaining—can support and even feed multi-stakeholder collaboration in VWs.

As a result, the 5-day intensive workshop provided rich, hands-on validation of the OPENVERSE co-creation methodology and toolkit in real-world, immersive settings. It also generated critical insights into platform affordances, tool adaptability, and user engagement dynamics across different industrial domains.

Consequently, it proves foundational in shaping the first version of the OPENVERSE Handbook of Co-Creation Methodologies (D1.1, Version 1, M24) and contributes with insights to the reflection on ethical, human-centric, and interoperable VWs. In particular, it reinforces the potential of VWs not only as tools for prototyping and experimentation but as strategic spaces for inclusive, collaborative innovation across the European industrial and public ecosystem.

1 BACKGROUND AND RATIONALE

Co-designing in Virtual Worlds for boosting innovation

Led by Prof. Francesca Rizzo, with Riccardo Ventura, Ilaria Mariani, Venere Ferraro

Duration. 5 full Days, 9am - 6pm

This intensive five-day workshop is conceived as a structured experimentation with co-design practices in Virtual Worlds (henceforth, VWs) to investigate their potential in supporting innovation across a spectrum of traditional and emerging industries.

Situated at the intersection of design research and immersive technologies, the workshop engages a cohort of designers in training, each of whom deliberately selected this workshop based on personal interest and prior experience with VWs—whether as users, creators, or researchers. Their familiarity with these environments provides a strong foundation for critical engagement with both the technological frameworks and design methodologies explored throughout the week.

1.1 RELATION TO OPENVERSE

This workshop was initiated as a result of an open call for participation in the co-creation activities of **WP1 “Co-creation of open-source tools for the Virtual Worlds”**.

The workshop is part of the activities of **T1.3 “Elaboration and implementation of co-creation methodologies”**, which aims to develop guidelines and ad hoc tools for co-creation in immersive environments across various sectors. It is one of the planned co-creation workshops informing the **first version of the OPENVERSE Handbook on co-creation methodologies (D1.1)**. The hands-on experimentation and critical assessment is aimed at tested co-strategies for designing free and open-source solutions for various industries, such as education, business, training, and work. The findings support the project’s broader goal of equipping stakeholders—including those from traditional industries such as tourism, real estate, fashion, and healthcare—with actionable approaches for innovation through immersive co-creation and co-design.

The workshop aims to critically explore how VWs can function as settings and catalysts for co-creation, across industries, by experimenting with VW affordances and design tools to understand how these environments can enable, shape, or constrain collaborative design. Drawing from the conceptual and methodological framework of OPENVERSE—including literature review and scoping of co-creation tools developed in prior project phases—participants are equipped with theoretical and operational tools to assess, adapt, extend, and organize co-creation within immersive digital spaces.

Eight VWs are proposed as the experimental platforms for the workshop: Engage VR, Arthur, Resonite, Fortnite, Spatial, Rec Room, VRChat, and Sansar. These platforms vary widely in terms of technological maturity, interaction models, and embedded affordances—ranging from productivity-focused enterprise VWs to gaming-centric social platforms. Each platform’s capacity for supporting co-creation was interrogated through practical testing and conceptual analysis.

Throughout the workshop, participants were encouraged to focus their exploration through a set of guiding questions:

- What are the key affordances of VWs that enable or hinder co-creation/co-design in or for industries?
- What strategies or "hacks" can be applied to enhance these affordances and better support innovation-driven co-design processes?
- What objects, services, or experiences can be co-designed by leveraging the specific affordances of selected VWs?

In response to these questions, participants (i) navigated and experimented within different VW platforms, (ii) applied and adapted co-creation tools and methodologies provided by OPENVERSE, (iii) explored industry sectors that stand to benefit from VW-based co-design, and (iv) developed hands-on design proposals situated within those sectors. Chosen industries included fashion, adult entertainment, marketing and communication, cultural heritage and museum experiences, education and language learning, sport and entertainment, and smart cities/urban planning. Within these domains, participants identified specific processes, services, or experiences as objects of co-creation, which they then developed into operational prototypes within the selected VW environments.

1.2 COHORT OF PARTICIPANTS

The workshop involved **36 design students** from the MSc programs of the **School of Design, Politecnico di Milano, forming a diverse and multidisciplinary cohort**. Participants came from backgrounds including UX/UI, communication, product and industrial design, architecture, interior and media design, service design, and game design. Many brought experience in immersive storytelling, UX research, exhibition and spatial design, VR/game development, embodied interaction, and AI-integrated or XR interfaces, while others contributed expertise in strategic design, data visualization, and rendering/animation.

This diversity enabled the group to approach VWs through multiple design and conceptual lenses—spatial, visual, narrative, and systemic—while fostering interest in participatory design, co-creation, and the sociotechnical dynamics of virtual interaction.

Overall, the cohort showed **moderate to high familiarity** with VWs. While most reported “discrete” to “good” knowledge, about one-third had **advanced experience** in VR/AR development, digital twins, simulators, or XR design for education, entertainment, or architecture.

Regarding the **eight VWs explored**—Engage VR, Arthur, Resonite, Fortnite, Spatial, Rec Room, VRChat, and Sansar—familiarity levels reflected broader cultural and professional exposure:

- **Most familiar:** Fortnite (1.69/4) and VRChat (1.50/4), due to their social and entertainment contexts.
- **Moderately familiar:** Spatial (1.47/4) and Engage VR (1.28/4), commonly used for education and co-design.
- **Less familiar:** Rec Room (1.22/4), Resonite (1.22/4), and Sansar (1.14/4).
- **Least known:** Arthur (1.11/4), with minimal prior exposure.

This distribution mirrors current cultural and professional trends—stronger literacy in socially visible platforms and exploratory engagement with emerging or specialized environments—allowing participants to critically and creatively test each platform’s co-creation potential.

2 STRUCTURE OF THE WORKSHOP

The workshop unfolded over five consecutive full-day sessions and was structured around seven main phases, each building progressively toward the development and evaluation of co-creation tools in VWs. Each phase was designed to deepen participants' understanding of immersive environments, co-creation practices, and the intersection of the two, with the final aim of exploring how VWs can be strategically appropriated to support innovation across industries.

Day	Phase	Activity	Outputs
1	1. Introduction	Setting the conceptual and operational foundation	Shared understanding of OPENVERSE goals, WP1 activities, co-creation definitions, and toolkit overview
		Brief and groups	Formation of groups of work and alignment on design brief
	2. Industry, Co-Creation Objects, VW exploration	Identification of context and object of co-creation	Defined target industry and selected object of co-creation (e.g., service, process, artefact)
		VW selection and initial analysis	Selected VW platform and initial rationale; mapped high-level affordances and user agency for co-creation
2	3. Toolkit Exploration	Exploration and tool selection	Selected tools from the OPENVERSE toolkit; notes on relevance to chosen VW and scenario
	4. Affordance Mapping	Mapping VW capabilities for co-design	Documented affordance analysis of the selected VW; alignment of affordances with features of the selected tool
2-3	5. Tool Translation & Design	Translating the tool into a VW environment	Developed detailed interaction model (scenes, interactions, assets, and user flow) for VW adaptation
3-4	6. Tool Development in VW	Implementation of the prototype	Interactive working version of the selected tool inside the chosen VW
5	7. Lessons Learnt & Recommendations	Reflection, feedback, and critical evaluation	Documented usability insights, platform limitations, lessons learned; contributions to D1.1

Each group synthesized feedback from the prototype sessions and critically assessed the overall process of translating, implementing, and testing their tool in the VW.

- They were encouraged to report on:
- What aspects of the tool worked effectively in the VW?
- What limitations did they encounter—technical, methodological, or experiential?
- How did the immersion, roleplay, or spatiality of the VW affect collaboration?
- What would they recommend to those planning to organise co-creation/co-design in VWs?

This phase produced a rich set of insights that directly feed into WP1's ongoing development of the co-creation methodology and will be incorporated into D1.1 "Handbook of Co-Creation Methodologies". It also provided a critical space for designers in training to consolidate their learning about the practical affordances and challenges of working within VWs as collaborative design environments.

3 WORKSHOP RESULTS

Bringing together 36 designers in training allowed the exploration and testing of the affordances of VWs for co-creation across sectors. The following synthesis presents the main results of each group and extracts overarching insights that inform future applications and methodological evolution.

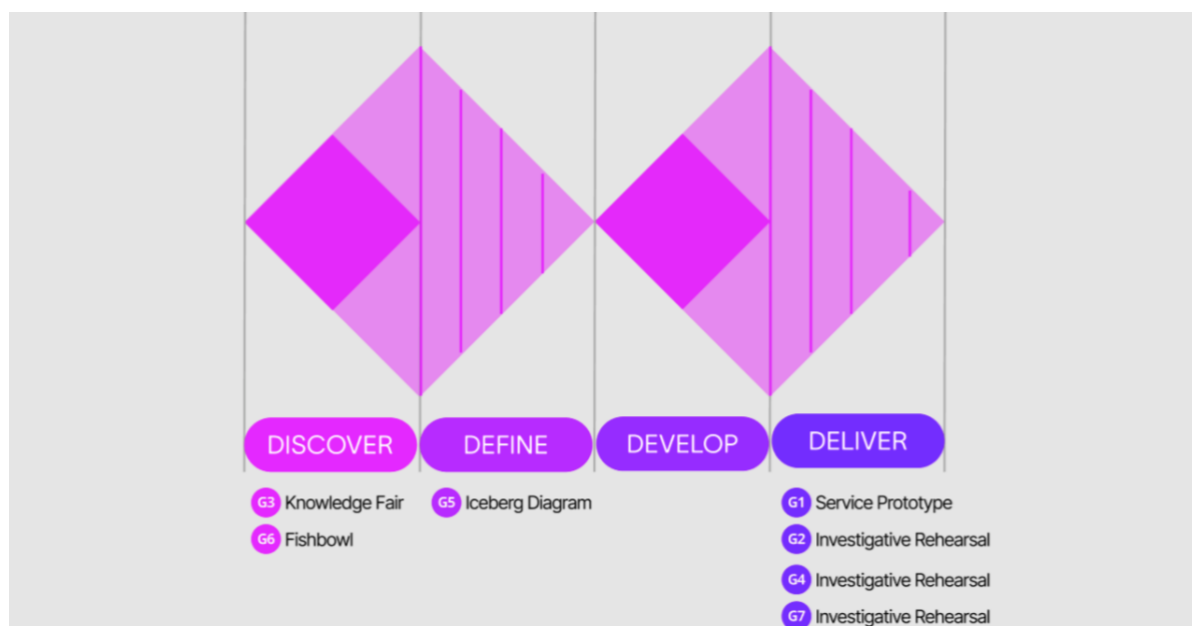


Figure 1: Tool distribution per DD phase

Below a summary of the workshop results, presented in the next paragraphs.

Group	Industry	DD Phase	Co-Creation Tool	VW Used	Role of VW Affordances in Co-Creation
G1	Sport	Deliver	Service Prototype	Spatial	Enabled spatial journey mapping, real-time role-based feedback, and immersive scenario walkthrough using portals and sticky notes.
G2	Fashion	Deliver	Investigative Rehearsal	Spatial + Unity	Supported realistic simulation (Unity) and spatial sequencing (Spatial); role-based interaction in wearable testing environments.
G3	Marketing	Discover	Knowledge Fair	Spatial	Enabled parallel ideation, knowledge booths, media sharing, and spatial distribution of themes to structure early divergent thinking.
G4	Adult Entertainment	Deliver	Investigative Rehearsal	VRChat	Provided high emotional fidelity through avatar roleplay, embodied interaction, and custom-triggered scenarios for ethical service design.
G5	Museum	Define	Iceberg Diagram	Spatial	Used layered spatial metaphor, voice/image uploads, and reflective prompts to scaffold emotional and interpretive co-design.
G6	Education	Discover	Fishbowl	EngageVR	Enabled structured dialogue via voice zones, role-based seating, and sticky notes; strong presence but limited content persistence.
G7	Smart Cities	Deliver	Investigative Rehearsal	Spatial	Enabled policy simulation via scene chaining, symbolic exaggeration, and role-based stakeholder walkthroughs.

GROUP 1. SPORT / CO-WATCHING FOOTBALL IN SPATIAL

Use case & object of co-creation. G1 addressed the growing demand for shared media experiences by focusing on co-watching football matches in a virtual environment. The object of co-creation was a **service** that enables fans to gather, watch, and comment on live games within an immersive VW. The selected industry is sports media and entertainment, motivated by engagement trends and the desire for social presence in remote events.

VW selection & affordance mapping. The team selected **Spatial** for its low barrier to entry, browser-based access, real-time interaction, and embedded multimedia support. They effectively linked Spatial's affordances to the task of engaging fans and stakeholders in a realistic co-design scenario. Whiteboards, sticky notes, and collective annotation spaces were used to enable stakeholders to comment on and shape each phase. Affordances for spatial layout, real-time avatar presence, and screen sharing allowed participants to immerse themselves in the process as if they were navigating a real-world venue.

Tools selected.

- Discover: Envisioning the future
- Define: Mapping journeys
- Develop: AI functionalities cards
- Deliver: Service prototype

Tool implementation & translation. Among several mapped tools, the team implemented a **Service Prototype** as the primary vehicle for stakeholder co-design. They created a **"Central Hub"** where the full fan journey could be visualized and navigated. Through the use of portals, visitors could move between phases of the journey (e.g., pre-match engagement, live match commentary, post-game analysis), observing user perspectives at each stage. They explored how co-watching could be collaboratively designed and improved, exploiting the central hub and portals to support co-creation around phases of the experience, indicating a strong move into design development, after initial problem framing. Spatial's feedback features were used to allow stakeholders to comment and iterate on the design. The co-creation occurs through role-based interactions, where participants play fan, organizer, or marketer to annotate and evaluate service aspects.

VW affordances exploited:

- Portals: to simulate different moments of the service (pre-match, during match, post-match).
- Whiteboards & Sticky Notes: to support asynchronous feedback from stakeholders.
- Spatial layout: allowed mapping the journey spatially, giving form to service touchpoints.





Figure 2: Service Prototype implemented in Spatial to support co-design of a co-watching football experience. The Central Hub and journey portals allowed stakeholders to collaboratively explore and reflect on different phases of the fan experience. Created by Efe Eren Can Bakir, Sofia Robles Ramirez, Aranza Villarreal Alcala, Arianna Albertini, Siyuan Yan, Yuxin Zhang.

Impact on co-creation. Spatial allowed mid-stage co-design activities like journey walkthroughs, commenting, and ideation on existing concepts, but was less suitable for early divergent ideation due to tool limitations (no flexible sketching, constrained feedback mechanics). The VW made the journey visible and navigable, enabling reflection and refinement.

Insights & lessons learnt. The VW helped visualize both the global journey and its granular parts, allowing for parallel understanding of system-level and user-level dynamics. Key insights included the tension between conceptual fluidity and platform limitations. Spatial's restricted sticky note usability, low-fidelity object control, and lack of undo functionality presented clear challenges. However, the team also found that these constraints pushed them to simplify their design for clarity and user flow. Importantly, the prototype allowed stakeholders to **visualize and interact** with the fan journey, creating space for experiential discussion around user needs.

Reflection. The group concluded that while Spatial supports mid-to-late-stage design validation well, it is **less suitable for early-stage ideation**. As such, VWs should be paired with external tools or richer environments for full-cycle co-creation processes. Their work showcased how VWs can simulate emotional and spatial aspects of a service in a compelling and participatory way.

GROUP 2. FASHION / TECHWEAR SHOWCASE IN SPATIAL + UNITY

e case & object of co-creation. G2 selected the **fashion industry** with a focus on digital-to-physical prototyping of techwear garments. The object of co-creation was a **service-experience hybrid** that allows designers and end-users to test garments' behaviour under various simulated conditions (light, temperature, motion). The group identified several pressing challenges in the fashion industry, spotting as urgent the need to accelerate prototyping cycles, gather and test ideas at scale through global crowdsourcing, and respond rapidly to emerging cultural trends—all while reducing R&D costs and staying closely aligned with consumer expectations. VWs are seen as an opportunity to experiment with NFT-based wearables, opening new pathways for value creation and personalization to co-develop the future of fashion in real time.

VW selection & affordance mapping. The team adopted a hybrid approach combining Spatial for communication and navigation and Unity for environmental simulations. Spatial was chosen for its low barrier to entry and support for real-time interaction, while Unity enabled reactive material behavior modeling. Portals in Spatial were used to enter scenario spaces, with role-based access for wearers and observers. Unity's affordances—such as animation of garment textures under variable lighting—enabled the “performance testing” of techwear items. The simulation was organized into stages: entering via a portal, engaging in role-based interaction (wearer/observer), and returning for reflection. Key affordances used included Unity's ability to simulate environmental conditions and Spatial's navigable portals and spatial mapping. This allowed the team to embed testing activities in situ, showing the techwear's properties and performance live in the VW.

Tool selected.

- Discover: Cultural probes
- Define: Co-creating personas
- Develop: Innovative brainstorming
- Deliver: Investigative Rehearsal

Tool implementation & translation. The selected tool was **Investigative Rehearsal** (Deliver phase), which the group adapted to a distributed multi-scene VW experience. In Spatial, users were guided through a showcase hub, entered testing rooms via portals, and performed tasks with wearable objects. Unity simulations were triggered by entering specific environments, demonstrating clothing responsiveness. Observers were given tools for reflection and annotation. The experience was divided into structured steps: enter the portal, perform role-based activity, return and reflect.

VW affordances used:

- Unity simulation: enabled material reactions (light, motion, temperature).
- Spatial portals and role-based rooms: structured user journeys into testing stages.
- Interactive object manipulation: to explore how wearables behave dynamically.



Figure 3: Investigative Rehearsal tool translated into Spatial + Unity to simulate performance testing of techwear garments. Role-based environments enabled immersive observation and dialogue between designers and users. Created by Kexin Ma, Clara Agustin, Rina Su, Mingyang Song, Yuchen Zhang.

Impact on co-creation. This group used the VW to test and rehearse real-world scenarios, showing co-creation in a performative, semi-final stage. The VW served as a simulation environment, capturing experiential feedback and demonstrating functionality. However, feedback cycles were short and ideation was predetermined, suggesting a low-to-medium degree of open co-creation.

Insights & lessons learnt. The environment successfully simulated **product interaction under variable conditions**, capturing the nuance of garment testing and supporting stakeholder dialogue around usability and aesthetics. However, Spatial's limited interactivity and basic feedback tools

constrained collaborative depth. Integration between Unity and Spatial required preparatory scripting and wasn't editable by users in real time. Still, the combination demonstrated the **power of combining immersive simulation with spatial storytelling for co-design**.

Reflection. The group identified a clear trade-off between immersive fidelity (via Unity) and collaborative flexibility (via Spatial). While Spatial helped structure the experience and enabled stakeholder navigation, it lacked the interactivity for early co-ideation. Unity delivered high-fidelity simulations but lacked open collaboration. This project showed how **cross-platform workflows** may be necessary to support different phases of co-creation in VWs.

GROUP 3. MARKETING / KNOWLEDGE FAIR IN SPATIAL

Use case & object of co-creation. G3 tackled co-creation in the **marketing and communication industry**, focusing on how diverse stakeholders (creatives, strategists, clients) could jointly surface insights to shape innovation strategies. The object of co-creation was the **knowledge exchange process**—specifically enabling divergent thinking in early-stage ideation.

VW selection & affordance mapping. The team selected **Spatial** for its **presentation-like structure**, accessible interface, and real-time interaction capacity. Spatial zones were used as **thematic knowledge booths**, where stakeholders could view, upload, and comment on different marketing topics or assets. The ability to embed external files and create dedicated interaction areas was seen as a core enabler of ideation.

Tool selected.

- Discover: Knowledge Fair
- Define: Co-creative workshops
- Develop: Experience prototype
- Deliver: Subtext

Tool implementation & translation. The implemented tool was **Knowledge Fair** (Discover phase), translated into a virtual environment composed of spatially distributed thematic areas. Each booth represented a key area in campaign ideation—product vision, customer insight, brand storytelling, etc.—and contained visuals, content prompts, and feedback anchors. Participants acted as contributors, reviewers, or strategists. The VW hosted parallel knowledge sharing through spatial navigation, where users could annotate and respond to each display. Spatial's download/upload capability and asset placement features were used to simulate **material sharing**, a vital component in marketing collaboration. The aesthetic consistency and spatial layout gave the prototype high functional coherence. The **working environment was visually and functionally coherent**, mimicking a showroom with dedicated zones.

VW affordances used:

- Spatial zones and interaction points: acted as booths for different marketing ideas.
- Media boards and upload functions: facilitated content sharing and stimulus exchange.
- Live co-presence: enabled real-time ideation, comment threads, and cross-dialogue.





Figure 4: Knowledge Fair implemented in Spatial, with thematic booths and interactive areas enabling early-stage stakeholder engagement, idea surfacing, and distributed input collection. Created by Gaia Ranzani, Martina Stucchi, Giulia Montelli, Chiara Aliverti, Yifan Lu.

Impact on co-creation. The VW amplified early collective brainstorming, allowing stakeholders to contribute in parallel. However, friction emerged from asset control issues (e.g., host-only object movement) and limited chat integration. The VW's strength lay in creating a structured yet open space for divergent thinking and knowledge surfacing.

Insights & lessons learnt. The group demonstrated how **VW-based spatial layouts** can structure brainstorming. Participants could explore themes at their own pace, view others' contributions, and generate inputs in a distributed yet connected way. Challenges were noted in collaborative manipulation of objects—only hosts could move certain items—and in the integration of assets from

Blender. Users unfamiliar with Spatial's interface also struggled with simple navigation and interaction mechanics (e.g., emotes, chat visibility). Therefore, object manipulation issues (e.g., host-only control), difficulty importing complex visuals, and weak feedback tracking limited iterative depth. Real-time voice or chat interaction was underused, highlighting that affordance **potential does not equal effectiveness** without facilitation.

Reflection. The prototype proved valuable for supporting **early-phase discovery and idea surfacing**, especially in distributed stakeholder groups. Spatial worked well for thematic differentiation and visual framing. However, the absence of collaborative co-editing and feedback clustering suggests it needs pairing with other tools for deeper synthesis and refinement.

GROUP 4. ADULT ENTERTAINMENT / SAFE IMMERSIVE SERVICE DESIGN IN VRCHAT

Use case & object of co-creation. G4 selected the **adult entertainment industry**, a domain often neglected in co-design research due to ethical complexity. Their object of co-creation was a **service** aimed at enabling emotionally safe and respectful interaction spaces, particularly for sex workers and long-distance couples. The group focused on **designing with and for marginalized communities**, making inclusivity and ethical design core priorities. G4 put in place co-creation for engaging stakeholders in designing a respectful and emotionally safe environment. Through shared decision-making, they want to co-design tools, values, and boundaries that support diverse experience, creating a space where all users feel seen, heard, and protected.

VW selection & affordance mapping. The group selected **VRChat** for its strong **avatar embodiment and personalization possibilities, expressive range, and openness to customization**. Affordances exploited included personalized avatars, scenario-based room building, embedded interactions, and voice-based real-time dialogue. VRChat's social nature and custom scripting allowed high emotional realism and freedom of movement—essential for testing boundaries and behavioral norms.

Tool selected.

- Discover: Sociometrics
- Define: System scenario
- Develop: Innovative brainstorming
- Deliver: Investigative rehearsal

Tool implementation & translation. The tool is **Investigative Rehearsal** (Deliver), applied to **three distinct scenarios**, each represented in a separate VRChat room: Emotional boundary testing; Simulated long-distance interaction; Observer/ethicist role feedback. Each scenario was implemented through custom-designed rooms, role-based entry points, and trigger-based transitions, props, and voice zones. Interactions were designed to elicit affective feedback and expose latent barriers. Stakeholders were invited to test the flow and report reactions using embedded cues and feedback scripts.

VW affordances used:

- Avatar-based roleplay: enabled testing of emotional comfort and interpersonal boundaries.
- Custom worlds and triggers: allowed condition-specific scenario creation.
- Embodied interaction: was critical to testing spatial and affective features of the service.



Figure 5: Investigative Rehearsal translated into VRChat across three scenario rooms. Custom avatars and trigger-based interactions enabled emotionally sensitive co-design and ethical reflection. Created by Michelle Mei, Riccardo Di Marco, Michela Pace, Daniela Perez Ardila, Inkar Raissova.

Impact on co-creation. VRChat's immersive presence and expressive interaction enabled co-design that was both behavioral and ethical. The group used it to simulate interaction in real use contexts, therefore observing direct reaction of users in order to grasp their pain points. This was deep participatory design, though with predefined boundaries—more exploratory validation than co-conceptualization.

Insights & lessons learnt. G4 pushed **ethical design via lived simulation**, using VW affordances to surface discomfort, pleasure, and boundary crossing in real time. Their layered design and inclusion of multiple user perspectives allowed rich co-reflection. Still, VRChat's lack of built-in feedback logging, limited moderation tools, and privacy complexity made controlled iteration difficult.

Reflection. VRChat's affordances were essential for emotional fidelity and interaction variety. **Simulated immersion is used to expose deep experiential design variables**—a key insight for co-designing sensitive services. Challenges included managing controversial content in public VWs, limited moderation mechanisms, and a lack of integrated feedback collection systems. Ethically complex and behaviorally rich use of VW with respect to key principles such as ethical stakes, inclusion dynamics, and participatory equity. The overall methodological clarity and **domain-specific sensitivity** resulted in one of the most thoughtful implementations of co-creation in the workshop.

GROUP 5. MUSEUM / ICEBERG DIAGRAM FOR VISITOR EXPERIENCE IN SPATIAL

Use case & object of co-creation. G5 explored **co-creation in cultural heritage**, focusing on participatory design of museum experiences. The selected object was the visitor journey, emphasizing emotional, cognitive, and reflective engagement. The group sought to visualize how visitors' reactions and expectations can shape exhibit design.

VW selection & affordance mapping. Spatial was chosen for its **navigable layout, voice notes, and content uploading capabilities**. The group created a multi-layered 3D “iceberg” model, each level accessible via portals or spatial descent. Visitors were prompted to respond with **voice clips or images**, reflecting how each exhibit made them feel or think. These interactions were designed to simulate co-creative feedback across emotional and intellectual dimensions. The metaphorical format allowed deep engagement with user expectations and values.

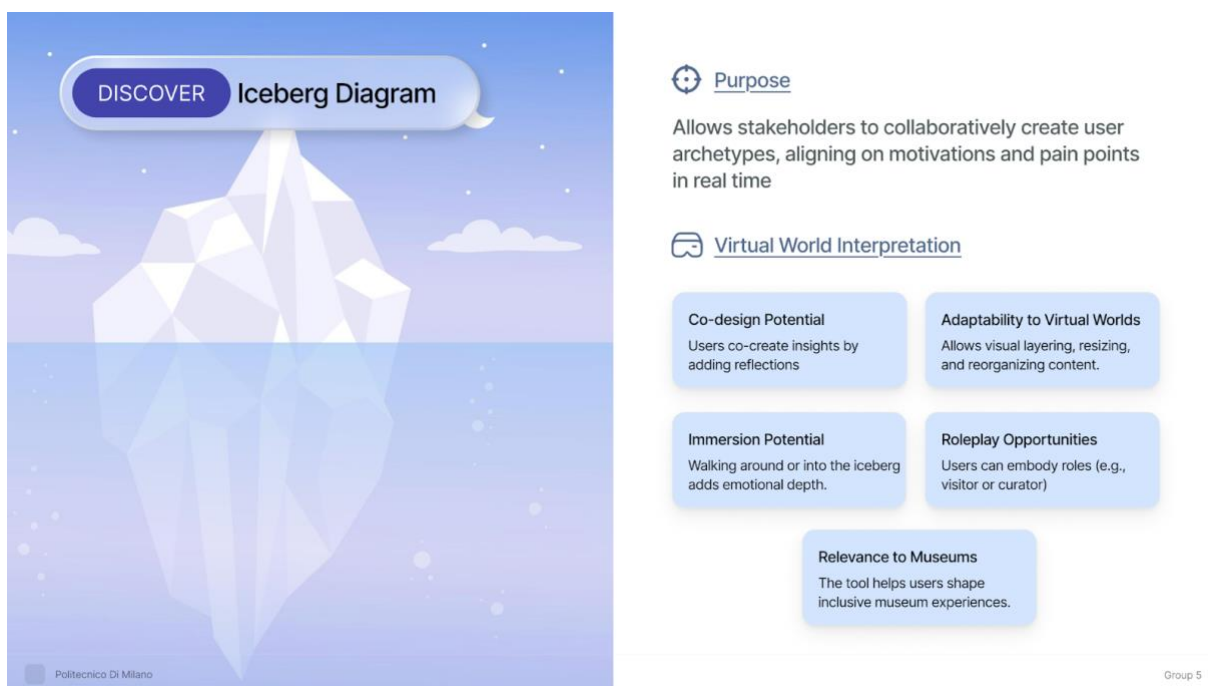
Tool selected.

- Define: Iceberg diagram
- Define: Co-creating personas
- Develop: Ecosystem map
- Deliver: Desktop walkthrough

Tool implementation & translation. G5 chose the Iceberg Diagram (Define phase) and translated it into a participatory exhibit, structuring reflections across four levels of user experience: emotions, meaning, reflection, and societal interpretation. The VW prototype implemented this as a multi-layered space in Spatial, where users could move between levels and contribute insights through different modalities. Each layer of the iceberg corresponded to a co-creation depth: surface reaction, interpretation, societal reflection. Prompt boards asked questions like “What emotion did this trigger?” or “How does this relate to your beliefs?” Participants’ responses accumulated across layers.

VW affordances used:

- Layered spatial metaphor: replicated levels of engagement through movement.
- Voice recording and image uploading: allowed visitors to contribute emotional and visual feedback.
- Spatial prompts: triggered reflection and interaction.



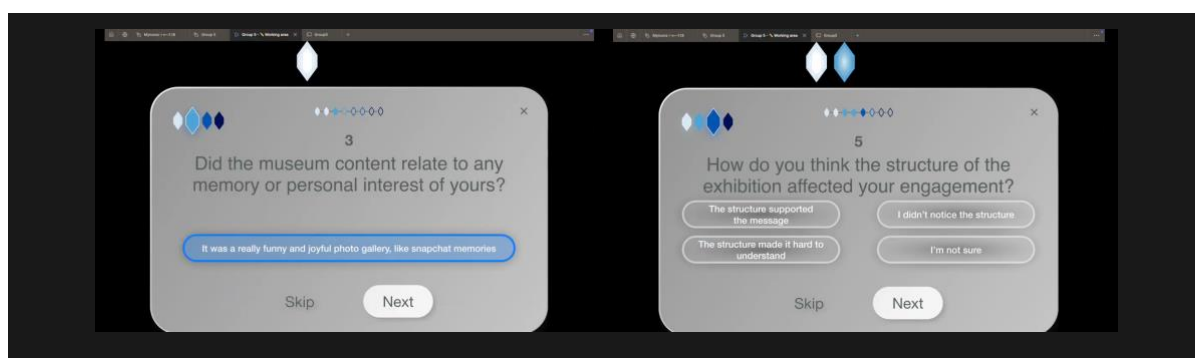
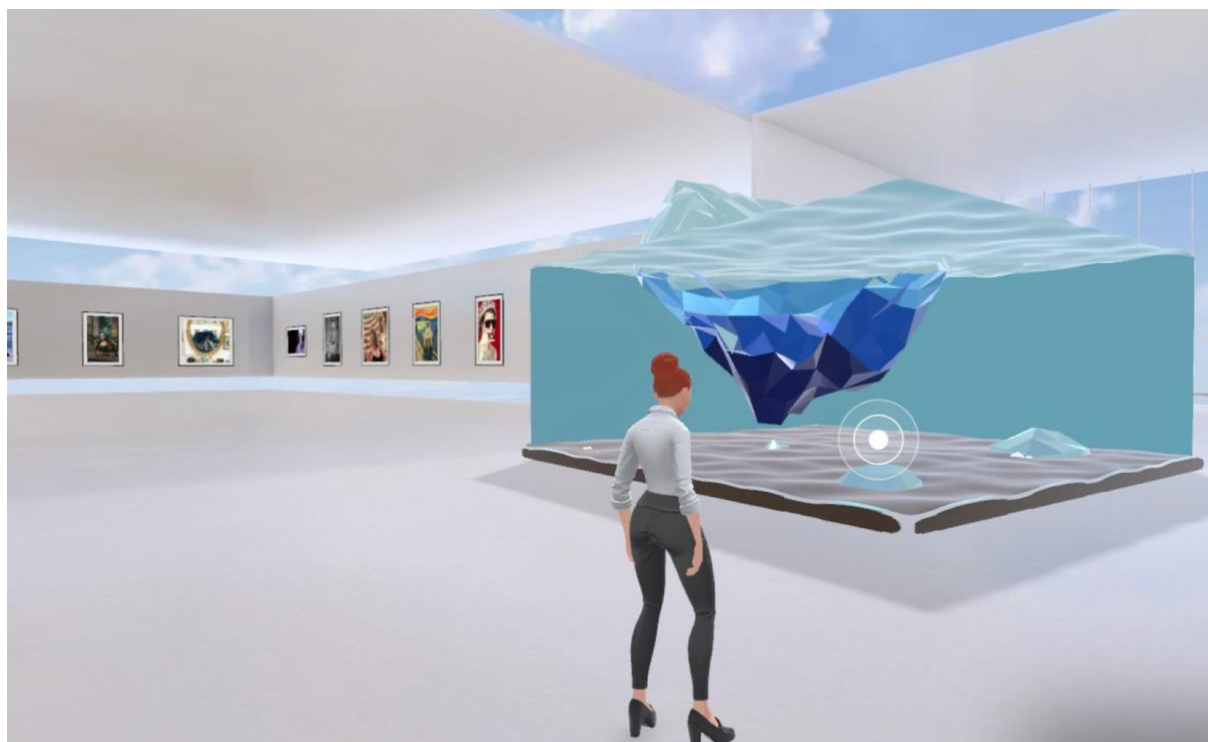


Figure 6: Iceberg Diagram recreated in Spatial using a multi-layered spatial metaphor. The group designed immersive prompts and feedback zones to co-create deeper visitor engagement strategies. Created by Mehmet Aflazi, Tuana Toraman, İlke Skkuzu, Özlem Yilmaz, Bipasa Das.

Impact on co-creation. Spatial helped externalize abstract insights into tangible layers, making emotional and meaning-based co-design possible. The group was still in exploratory conceptualization, with low-fidelity implementation and limited cycles of stakeholder feedback. Affordances enhanced reflective participation but not yet iterative design.

Insights & lessons learnt. The tool successfully scaffolded **depth-based reflection**, allowing visitors to interact with content and contribute evolving meaning. However, limitations in **feedback clustering**, **anonymous moderation**, and **interaction tracking** reduced analytical usability. Role-playing was minimal, and stakeholder diversity was not fully simulated.

Reflection. The use of the iceberg metaphor successfully facilitated layered, reflective co-design, but would benefit from enriched interactivity and structured analytics. The group used metaphor and spatial verticality to elicit layered insights—powerful for curatorial dialogue. The result is an interesting view of how designing museum experiences can become participatory, while including

digital layers. There are potentialities for active multi-user scenario development and clearer post-response curation.

GROUP 6. EDUCATION / LANGUAGE LEARNING WITH FISHBOWL IN ENGAGE VR

Use case & object of co-creation. G6 addressed **co-creating educational experiences**, particularly for language learning. The object of co-creation was the **learning journey**, specifically focusing on how learners and educators can collaboratively improve curricula and structure sessions to improve fluency and immersion. The process was designed to involve both learners and educators in designing adaptive and inclusive pedagogical flows. The VW served as a simulated learning environment to experiment with spatialized dialogue and feedback.

VW selection & affordance mapping. G6 selected **Engage VR** for its educational focus, classroom templates, and voice spatialization. The VWs features allow for custom environments, voice chat, spatialized audio, and role-based movement between participation zones.

Tool selected.

- Discover: Fishbowl
- Define: Co-creative workshop
- Develop: System UX map
- Deliver: Desktop system mapping

Tool implementation & translation. The group recreated a Fishbowl setting (Discover phase), reimagined as a central virtual hub in the VW. The environment recreated conversational setups, where learners in the “inner circle” shared experiences, while observers in the “outer circle” noted and commented. The tool was therefore translated into a modular reflection space. Engage VR supported this setup through room segmentation, audio zones, and role-based seating. Sticky notes were used to capture learning barriers or tips. Discussions were audio-recorded, and user movement between roles was used as a proxy for engagement.

VW affordances used:

- Voice-based spatial dialogue: recreated public-private discussion zones.
- Sticky notes and boards: enabled collecting and reacting to dialogue points.
- Role-based spatial division: outer/inner circle allowed learner-observer dynamics.

AFFORDANCES OF ENGAGE VR

Environment Customization



Enhancing **engagement and focus**

Free to move 3D objects



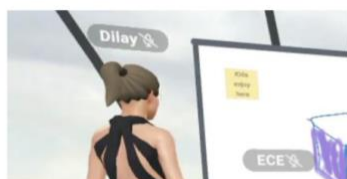
Objects can be **scaled, rotated and moved** freely

Whiteboard Interaction



Allows participants to **note key points, questions, or insights**

Avatar Mobility



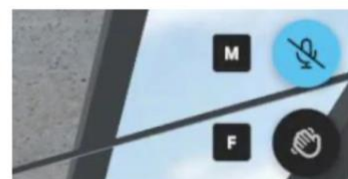
The avatars in EngageVR could move freely and can **interact with the objects** such as sitting and drawing

3D Pen



Pen tool enables **react in 3D**, which boosts the discussion speed

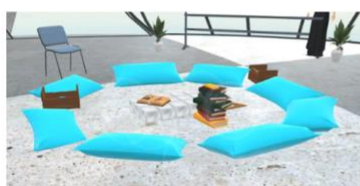
Emojis



Users clearly heard others through the headset, and **avatar emoji reactions** enabled **non-verbal interaction**

ENVIRONMENT ELEMENTS

Inner Circle



Designed for the **main discussion group**, enabling active conversation and dynamic role exchange with the outer circle.

Outer Circle



Supports an **observer role**, with the ability to take notes on whiteboards or sticky notes and **switch roles with the inner circle**.

Supportive Elements



Random supportive elements help **facilitate communication** within the inner circle during discussions.



TEST OUTPUTS

Free to move 3D objects



Free to add and edit 3D elements to discuss and develop ideas.

Users can edit only the objects they created, and these objects disappear when the creator leaves the session.

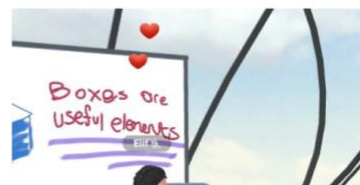
Sticky Notes



Everyone can add sticky notes and place them freely.

Excessively free movement of sticky notes can cause a messy layout.

Emoji



Emojis are useful for expressing emotions and voting ideas quickly.

Emojis appear too briefly (less than two seconds), making them hard to notice.

3D Drawing



Transforms 2D sketches into spatial forms and supports collaborative, dynamic expression.

Unstructured space makes precise drawing difficult; users may prefer switching to voice input instead.

Whiteboard



Unlimited whiteboards offer flexible, open space for idea sharing and collaboration.

Writing feels awkward; optimized for simple drawing or encouraged sticky note use would improve usability.

Tablet



Familiar tablet interactions offer intuitive control within the virtual space.

Directly replicating physical objects may limit VR's unique interaction potential.

Figure 7: Fishbowl tool implemented in Engage VR with spatialized audio, role-based zones, and reflective boards, enabling collaborative dialogue and iterative curriculum design. Created by Elif nur Çakir, Duygu Can, Dilay Aslan, Ece Yalim.

Impact on co-creation. Engage VR was particularly effective for spatial conversation scaffolding, supporting semi-structured reflection. The group demonstrated that early ideation and mutual understanding can be enhanced through embodied roleplay. Yet the platform lacked advanced co-authoring and persistent editing capabilities—feedback could be lost when users exited.

Insights & lessons learnt. The VW supported **realistic learner interaction** and presence, but suffered from **content persistence issues**—sticky notes vanished when users left, and editing rights were inconsistent. Still, the Fishbowl model enabled role awareness and promoted **reflection-in-action** and simulated turn-taking. Usability issues included excessive freedom of sticky notes and lack of persistent editing rights. Moreover, it lacked flexibility in asset management—users could only edit objects they created, and those disappeared when users left. Despite this, the group offered one of the most comprehensive usability critiques, mapping how tool limitations affect engagement, presence, and control.

Reflection. This work exemplified pedagogical experimentation in VWs, showing how spatial and audio affordances can shape learning dialogue. It confirmed that VWs can **structure reflective, social learning**, but current tools must better support feedback storage and asynchronous continuation. It also exposed gaps in current VW platforms for structured educational design, especially around persistence, accessibility, and content layering. Fishbowl's logic worked spatially but required better digital tool integration for real-time and post-session use.

GROUP 7. SMART CITIES / URBAN PLANNING IN SPATIAL

Use case & object of co-creation. G7 tackled urban co-planning, focusing on air pollution scenarios for awareness and mitigation. The object of co-creation was the planning and governance process, structured as a participatory simulation engaging stakeholders such as citizens, planners, policymakers, and engineers. The objective is using simulation to allow stakeholders to explore, test, and critique proposed interventions.

Tool selected.

- Discover: Problem framing
- Discover: Knowledge Fair
- Define: System scenario
- Develop: experience prototype
- Deliver: Investigative rehearsal

VW selection & affordance mapping. **Spatial** was selected for its scene chaining, visual annotation, and support for walkthroughs. A sequence of rooms simulated planning phases—from data exploration to policy decision—each populated by relevant props and dialogue stations.

Tool implementation & translation. G7 implemented **Investigative Rehearsal** (Deliver) as a role-based exploration. The tool is translated into a walkthrough-style prototype in **Spatial** consisting of scenes tied to specific phases and stakeholders—citizen, planner, engineer. Stakeholders walked through rooms, made decisions, and viewed the consequences. The simulation presented augmented representations of planning scenarios—exaggerated elements that clarified choices and stimulated roleplay. The VW prototype used **Spatial**'s layout zones, feedback boards, and audiovisual markers to structure engagement. Participants could move between zones, enact roles, and engage in planning dialogues informed by visual representations. Prompts encouraged feedback on decisions' visibility, impact, and fairness.

VW affordances used:

- Scene-based navigation: allowed structuring planning phases.
- Stakeholder role areas and dialogic zones: organized collaborative design spaces.
- Feedback prompts and symbolic exaggeration: enhanced engagement and provocation.

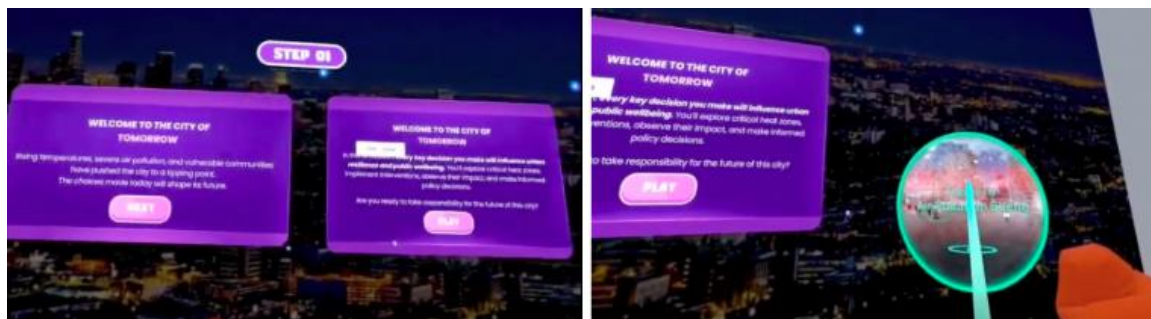




Figure 8: Investigative Rehearsal adapted in Spatial to simulate urban co-planning. Scene-based navigation and stakeholder roleplay allowed participants to test and critique planning scenarios. Created by Estifanos Eyasu Yimam, Duru Kalay, Beatriz Lara Espinosa, Luo Fengrong, Duan Muzi, Li Xingyu.

Impact on co-creation. This was a highly developed, immersive co-creation process, where VWs enabled experiential exploration of complex policy dynamics. G7 used VWs not just to simulate reality, but to augment it for learning, indicating a strong move toward co-design validation. They also captured user reflections, making the loop nearly complete.

Insights & lessons learnt. The work showed how **augmented simulation** helps users experience abstract governance trade-offs. Spatial was effective in **scaffolding scenes, layering content, and supporting discussion**, though lacked analytics and deeper interactivity. The group articulated a distinction between simulation and augmentation, designing for provocation rather than fidelity. This allowed clearer insight into how decisions play out across stakeholders and contexts.

Reflection. Advanced integrations of **policy design and VW immersion**, showing how VWs can scale co-creation by simulating complex systems in approachable ways. Visual storytelling is identified as effective in inviting role-based participation and critique. Advanced thinking on how VWs can scale participation, structure comparative scenario testing, and elicit experiential understanding of complex urban issues. Tool limitations were noted around feedback persistence and analytical granularity.

4 INSIGHTS

The workshop experimented with co-creation across diverse industries and objects, demonstrating how the association of VWs spatial, interactive, and immersive affordances can be purposefully aligned with specific phases of the design process in order to inform it.

4.1 A FOCUS ON CO-CREATION

Across the 5-day workshop, the seven groups explored how the co-creation potential of VWs has varying levels of complexity, depth, and alignment to different stages of the design process. Although the groups selected tools independently, an initial pattern emerged in their collective choices: most tools were adapted to support either early divergent phases of Discover or late-stage experiential validation of Deliver—phases which tend to be the most welcoming for collaboration. Tools from the Develop phase—which involve synthesis, iteration, or prototyping—were not experimented. The results acknowledge, therefore, a limit in scale and scope, with 3 VWs experimented, and not across all the Double Diamond design phases. Still, it has already surfaced how VWs are not equally suited to all moments of the co-design and co-creation processes, with their impact depending strongly on how their affordances are aligned with the design phases, the object of co-creation, and the type of stakeholder engagement intended.

G3 tested the affordances of VWs in supporting **early ideation in the Discover phase** through their translation of Knowledge Fair into Spatial. This group achieved the most complete implementation of distributed brainstorming in a VW context. Spatial zones and thematic booths enabled multiple users to contribute asynchronously to different dimensions of a campaign design challenge. The impact on co-creation was high in terms of divergent thinking and idea surfacing, but less effective for synthesis or deep iteration. Tool limitations—particularly host-only object control and limited annotation mechanics—hampered collaborative depth. As a result, the group showed that early co-creation is feasible in VWs, but only if facilitated with clarity and paired with robust back-end documentation strategies.

In the education domain, G6 used Engage VR to simulate a Fishbowl conversation setup for language learners and educators. Their implementation highlighted the strengths of VWs in scaffolding semi-structured reflection and social role-play. By dividing the room into voice-zoned circles, they facilitated structured dialogue and movement between roles. The co-creation process supported mutual understanding and ideation in early stages, but suffered from technical constraints. Feedback often disappeared after sessions, and notes could not be persistently managed across users. These usability issues diminished the sustainability of engagement, yet the group clearly demonstrated the role of spatial dialogue and embodied roles in fostering educational co-creation.

In the **Define phase**, G5's museum project used the Iceberg Diagram to scaffold co-creation through layered reflection. Spatial was employed to externalize user insights across emotional, interpretive, and cognitive dimensions. The metaphorical framework translated well into the spatial medium, and while actual stakeholder interaction remained low-fidelity, the approach showed how VWs can support the elicitation of tacit knowledge and value-driven dialogue. The group remained in the exploratory phase of co-creation, with limited iteration or feedback loops, but effectively mapped out how metaphorical spatialization can facilitate engagement with abstract experiential layers of a service.

During the Deliver phase, mid- to late-stage validation and experiential simulation emerged as particularly well supported. G1's sports use case demonstrated how Spatial could be used effectively to map a complete user journey and engage stakeholders in immersive walkthroughs of the fan experience. Co-creation here was situated in the refinement and validation phase, where visualizing the entire journey—made possible through portals and scenario segmentation—enabled shared reflection. However, the group also noted that Spatial's constrained sketching and annotation tools limited early ideation, highlighting a common pattern: co-creation in VWs is strongest when centered on navigating, exploring, and iterating on semi-formed ideas rather than generating concepts from scratch.

This pattern repeated in G2's hybrid use of Spatial in conjunction with Unity for the fashion showcase. Their implementation of Investigative Rehearsal within a structured, role-based environment supported stakeholder immersion into the techwear testing process. Yet their co-creation remained primarily performative—garment behavior was observed and responded to, rather than designed collaboratively. The group reached a low- to medium-level of open co-creation, as stakeholder inputs were integrated post-experience rather than actively shaping the prototype in real time.

G4's adult entertainment project emphasized ethically charged co-design in VRChat. Their use of role-based investigative rehearsal across three emotionally and socially sensitive scenarios demonstrated that co-creation can extend beyond functional refinement to include behavioral validation and boundary negotiation. Here, the VW was critical for testing spatial, interpersonal, and emotional features of a service in real time. While the group did not engage stakeholders in co-conceptualization per se, they facilitated experiential co-reflection, which in turn informed iterative redesign. Their approach underlines the potential of VWs to support deep participatory engagement, particularly in domains where conventional methods struggle to recreate lived experience. However, limitations in feedback tracking and moderation highlighted the need for structured reflection channels in sensitive contexts.

G7's urban planning simulation marked the most systematic and high-fidelity deployment of co-creation in the workshop. Their use of Investigative Rehearsal to simulate stakeholder walkthroughs of planning scenarios showed how VWs can be used not only to test systems but to provoke critical dialogue around decision impacts. By exaggerating elements of urban plans (e.g., pollution levels, zoning constraints), they enabled experiential understanding of policy trade-offs. Co-creation here was not just exploratory or reflective—it included the iterative testing of governance decisions with multiple stakeholders. This work showcased VWs as effective tools for experiential governance prototyping, even if analytical tracking and interaction granularity remain limited.

Adopting a comparative lens, several key themes emerge regarding the impact of VWs on co-creation.

- Affordances impact and even shape co-creation type requiring to choose the VW depending on the activity to be performed. Tools that leveraged spatial layout, role-based navigation, and scenario walkthroughs (G1, G7) tended to foster experiential or systems-level co-creation. In contrast, tools that depended on rich annotation, co-authoring, or dynamic feedback (G3, G5, G6) often struggled due to platform limitations.
- VWs support more than idea generation, contributing to value creation along the entire process. As demonstrated by G4 and G7, VWs could enable experiential co-creation—letting stakeholders “live” the consequences of a design or decision, and respond emotionally, socially,

and behaviorally. This dimension is rarely possible in traditional co-design workshops and underscores VWs' unique potential.

- Feedback continuity and persistence remain a major issue. Across all groups, persistent feedback mechanisms—such as editable boards, data export, or integrated analysis—were recognized as absent or insufficient. Without these, the insights from co-creation risk being transient or anecdotal, making iterative loops difficult to manage.
- Co-creation in VWs flourishes when the experience is carefully scaffolded and methodologically structured. Groups that incorporated clear interaction flows, staged environments, and explicit prompts for participation—such as G3 (Marketing), G6 (Education), and G7 (Smart Cities)—demonstrated higher levels of focused engagement and meaningful stakeholder input. In these cases, participants could rely on step-by-step navigation, role-based positioning, or/and guided reflection points, which helped them understand when and how to contribute. This structured approach gave form to the co-creation process, reducing ambiguity and cognitive overload in the virtual space. Conversely, groups that adopted a more open-ended exploratory model without defined interaction sequences or prompts often encountered more diffuse or uneven contributions. Without a shared rhythm or roadmap, some stakeholders engaged passively, vaguely, or confusedly, and even often struggled to situate their input within the overall process. Nevertheless, this openness also created room for unexpected forms of participation, particularly when emotional, behavioral, or interpretive responses were being elicited. Nevertheless, additional reflection suggests that structure and freedom are not mutually exclusive, but rather complementary. Co-creation in VWs may be most effective when initial structure guides entry and orientation, while open-ended elements allow for creative divergence or deeper personal expression. Designing for co-creation in immersive environments thus calls for a balance between clear frameworks to engagement, with enough flexibility to accommodate emergent contributions and diverse interaction styles.

4.2 SYSTEMATIZING LESSONS LEARNT AND REFLECTIONS

Across the seven groups, the workshop uncovered a wealth of practical insights into how co-creation can be facilitated, constrained, or even redefined within VWs. The lessons learnt and reflections gathered during the 5-day workshop reveal the multidimensional challenges and opportunities associated with translating co-creation into immersive settings with specific affordances and agencies. Below, common themes and tensions are identified while also spotlighting specific contributions made by each group.

4.2.1 Common Lessons Across Groups

A recurring observation concerns the **disconnect between tool logic and platform affordances**. While each group selected and reimagined a co-creation tool from the OPENVERSE toolkit, not all platforms supported the core interactions that these tools typically rely on—such as simultaneous editing, feedback persistence, sketching capabilities, or branching dialogue. Tools that were more spatial or dialogue-based (e.g., Investigative Rehearsal, Fishbowl) tended to fare better in translation than those requiring iterative prototyping or visual synthesis. **Handling persistent content** is also a challenge. The groups encountered issues where collaborative boards or notes were deleted when users left the session, or where only the host could manipulate key elements. This is linked to the possibility of building iteration and feedback loops. Although their importance was widely acknowledged, it was often difficult to implement. The platforms that lack features for tracking contributions, logging annotations over time, or clustering stakeholder inputs for analysis spur limitations to linear or “one-shot” co-creation engagements, rather than iterative cycles of refinement able to build on previous sessions. The lesson here is clear, and concerns that either the

VW is chosen due to specific affordances, all well known in advance, or co-creation needs to adapt to the contingency of the setting. These practical limitations point to the **fragility of current co-creation infrastructures in VWs**, especially for asynchronous or distributed collaboration. Future approaches may require external tools to supplement internal platform features or custom plug-ins that enable continuity across sessions.

On a positive note, the reflections pointed to an underexplored strength of VWs: their capacity to trigger emotional, ethical, and behavioral insights. In particular, G4 and G7 demonstrated how simulated interaction and roleplay can surface user needs that are difficult to articulate in traditional design settings. This emotional depth opens new frontiers for participatory design, especially in contexts involving vulnerability, identity, or policy trade-offs.

4.2.2 Group-Specific Reflections and Lessons

G7 (Smart Cities) delivered one of the most advanced applications of co-creation in Spatial, showing how immersive environments can function as augmented policy labs. By combining **scene-based navigation, role-based engagement, and structured what-if simulations**, the group enabled stakeholders to experience the implications of urban planning decisions—such as air pollution interventions—in a dynamic and participatory way. The integration of **feedback prompts**, visual exaggeration, and immersive storytelling allowed participants to test possibilities as well as what would happen by applying certain policies, reflect on outcomes, and articulate responses within the spatial environment. This setup demonstrated that VWs can significantly enhance policy co-creation by **transforming abstract governance trade-offs into tangible, experiential interactions**. However, the group also highlighted critical limitations in terms of data analytics, feedback tracking, and interaction depth. While participants could engage meaningfully in each scenario, the platform lacked tools to synthesize their contributions systematically or compare feedback across different roles or phases. The key lesson is that while VWs hold significant promise for making complex policy deliberation more accessible and interactive, greater analytical and synthesis functionalities are required to support structured decision-making and evidence-based iteration.

G5 (Museum) revealed how **spatial metaphors** can easily be adopted to scaffold reflective engagement, encouraging users to go through **representation/enactment of abstract concepts** into the VW as a setting where to share layered insights. While the group achieved a compelling conceptual translation, **interaction remained largely passive and lacked iterative development**. Their reflection pointed to the potential of using metaphors for co-design in cultural settings but also the need for enhanced interactivity and mechanisms for curating visitor input. Similarly, G1 (Sport) exploited Spatial's portals and journey walkthroughs for allowing stakeholders to experience a service concept in action, promoting reflection. While this feature was particularly appreciated, the poor usability of sticky notes and whiteboards was highlighted, calling for improved annotation tools and undo functionalities. Their key takeaway was that Spatial supports experiential discussion and validation but requires external tools or environments for early ideation.

G3 (Marketing) successfully created a distributed ideation space using booths in Spatial but encountered friction due to host-only object control and weak chat integration. They highlighted that affordances alone are not enough—without facilitation and robust user management, potential remains unrealized. Their lesson was to supplement VWs with structured back-end processes or parallel tools to support idea synthesis and follow-up.

G4 (Adult Entertainment) offered a particularly rich reflection on the **ethical stakes of co-design**. Their use of VRChat enabled behavioral rehearsal in sensitive scenarios, offering insight into emotional boundaries and interpersonal needs, as well as reflection on the need to secure a safe space for co-creation. However, they noted that VRChat lacked built-in feedback logging and

moderation tools, which made iteration and control difficult in ethically complex domains. Their key takeaway concerns the need to carefully moderate and intentionally design activities and spaces for inclusivity and safety.

G2 (Fashion) highlighted the challenges of working with **hybrid technological environments**, particularly the combination of Spatial and the Unity toolkit. While Unity enabled high-fidelity simulations of wearable behavior under different conditions, it lacked the collaborative flexibility needed for iterative co-design. Spatial, on the other hand, provided structured navigation and interaction but proved insufficient for deeper design iteration. The group recognized that while Spatial's current affordances support light brainstorming and moodboarding, they are not yet intuitive enough and may increase cognitive load—especially for stakeholders with lower digital literacy. As such, co-creation in these environments is not equally accessible to all participants, pointing to the need for more inclusive interaction models and simplified user interfaces.

G6 (Education) demonstrated how voice zones and role-based seating in Engage VR could effectively scaffold structured participation and reflective dialogue. However, significant usability issues—particularly the **non-persistence of user-generated content and limited editing rights**—undermined the continuity of co-creation. Because certain elements such as sticky notes or annotations disappear once the session ends or the generating user exits, co-creation must occur within a tightly bounded time frame. This makes the process highly synchronous and places the burden on facilitators or participants to extract and document insights in real time, before data are irretrievably lost. Although the VW itself persists, many of the collaborative artifacts created within it do not. The group's thoughtful critique highlighted that these platform constraints affect not only technical functionality, but also the rhythm, sustainability, and depth of engagement over time.

4.3 TAKEAWAYS

The results of the workshop highlight several converging tendencies in the design approaches and strategic decisions made by the groups involved in the co-creation activity. First, the cohort showed a clear tendency to select VWs with **medium-to-high levels of co-creation affordances**, with Spatial emerging as the platform of choice for five out of seven groups. Its ease of access, spatial organization, and visual structuring were consistently recognized as enablers, despite known technical limitations. VRChat and Engage VR were selected by the remaining groups for their strengths in expressive interaction and educational scaffolding, respectively.

Interestingly, while each group made independent choices during the tool selection phase, a **pattern of convergence** emerged around Investigative Rehearsal suggesting shared intuitions about which formats are more translatable to immersive environments. The translated tools covered three out of the four phases of the Double Diamond model: groups choose Discover, Define, and Deliver, yet none selected tools from the Develop phase.

A number of **cross-cutting insights** emerged from this hands-on exploration. First, the workshop showed that tool translation into VWs is feasible, but **requires a conceptual abstraction**. Tools need to be reimagined not in terms of their core functionality, which remains unaltered, but in relation to the specific object of co-creation, the roles of those activating the process, and the context in which co-creation unfolds. Rather than following a one-size-fits-all formula, the enabling translation depends on situational interpretation—how spatial, visual, and interactive dimensions are leveraged to fit the tool's intent. This translation often entailed repurposing symbolic elements (e.g., booths,

hubs, avatars) to express processual steps or stakeholder roles. This highlights the need for clear inspirational guidance, adaptable frameworks, and concrete examples that illustrate how different tools can be meaningfully enacted in VWs.

Second, the **fit between a tool's collaborative logic and a platform's affordances proved critical and inspirational**. Tools that demanded strong feedback mechanisms, asynchronous collaboration, or systematized analysis faced friction in platforms that lacked persistent data structures or open co-editing. Conversely, tools designed for dialogic exchange or exploratory rehearsal (e.g., Knowledge Fair, Investigative Rehearsal) were easily aligned with platform affordances like spatial segmentation, real-time voice, and symbolic visualization.

Third, **roleplay and spatial visualizations clearly enhanced stakeholder engagement**. Projects that enabled users to inhabit different viewpoints or move through staged environments (e.g., G1's match journey, G7's urban policy rooms) created meaningful spaces for empathy, reflection, and experiential feedback. The embodied navigation of co-creation journeys allowed stakeholders to reflect on individual and systemic impacts in a way not easily replicable in 2D settings.

At the same time, the workshop surfaced the **structural limitations of current VWs for co-creation and co-design**. Common issues included poor support for feedback clustering, lack of versioning or persistent annotations, host-only object control, and inconsistent user rights. These limitations often hindered iterative design and collaborative synthesis—critical phases of co-creation.

Several groups addressed these limitations through **multi-platform integration**, combining the immersive capabilities of Unity or the visual richness of Figma with the navigation and feedback space of Spatial. These hybrid workflows point to a growing recognition that no single platform currently offers a complete co-design ecosystem, and that linking tools across channels can help support different phases of collaboration—from immersion to documentation.

Finally, the workshop confirmed that **immersion and presence—achieved through spatial metaphors, voice, and avatar embodiment—significantly contribute to participation and engagement**. Participants reported feeling more invested in the co-design process when they could move through environments, perform roles, and react to visual or sensory cues. These findings reinforce the idea that **experiential context matters in co-creation**, and that VWs are particularly suited for simulating systems, prototyping futures, and enabling layered stakeholder reflection.

Overall, the workshop showed that co-creation in VW is technically feasible, methodologically rich, and emotionally powerful, but also infrastructure-dependent and highly context-sensitive. Future direction may concern building smarter bridges between immersive engagement and co-design logic—ones that can sustain not just participation, but also learning, iteration, and collective ownership of the design process.

APPENDIX D. REPORT ON THE SECOND CO-CREATION WORKSHOP

Report on the Co-Creation Workshop

“Co-Creating in Virtual Worlds: Eight Co-Creation Journeys Across Virtual Worlds”

3 September 2025

T1.3 Elaboration and implementation of co-creation methodologies

Author: POLIMI

1 INTRODUCTION: RATIONALE AND SCOPE

The 2nd Co-Creation Workshop of the OPENVERSE project, held on **3 September 2025 during EuroXR 2025** in Winterthur, was designed as a structured roleplay-based exploration and evaluation session. Its primary objective was to assess the applicability, adaptability, and perceived value of the **OPENVERSE Co-Creation Toolkit** across the selected **8 Virtual Worlds (VWs henceforth)**.

This workshop aimed to simulate real-world participatory design conditions in immersive environments, leveraging narrative-based scenarios and multi-phase co-creation journeys. Within this setting, the workshop tested how well individual tools support engagement, collaboration, and decision-making when deployed in diverse VWs.

Each of the 8 selected VWs was associated with a specific object of co-creation and a design scenario grounded in its spatial and social affordances. The workshop followed the structure of the **Double Diamond Design framework**, with each journey broken down into the four phases: Discover, Define, Develop, and Deliver. In total, 48 tools from the OPENVERSE Toolkit were integrated into these journeys, ensuring comprehensive testing and exposure.

Rather than simply presenting the tools in isolation, participants were immersed in scripted walkthroughs of realistic co-creation sessions. These narrative scenarios demonstrated how the tools could be used to support different phases of design in a collaborative, virtual setting. After each journey, participants provided structured feedback through **Wooclap**, evaluating the tools' clarity, relevance, and innovation potential.

The results of this workshop directly inform the refinement of the OPENVERSE methodology and feed into D1.1 "Handbook of co-creation methodologies", offering evidence-based insights on the strengths and limitations of the tools when used in immersive, participatory settings.

2 PARTICIPANT OVERVIEW

The workshop engaged **29 participants** from diverse professional backgrounds, selected through a targeted invitation process and open calls to XR communities. The participant group was intentionally multidisciplinary, ensuring a wide range of perspectives on co-creation practices in VWs. The sample included:

- **XR developers and engineers** (e.g., VR engineers, CTOs, platform developers)
- **Academic researchers and PhD students** in Human-Computer Interaction, immersive technologies, service design, and multimedia
- **Public sector** professionals exploring the use of immersive technologies in citizen services
- **Interaction and UX designers** with expertise in participatory methods and user research
- **Founders and executives** of XR startups focused on motion capture and immersive collaboration
- **Students** from technical and design backgrounds with experience using VWs in educational or creative contexts

Participants brought diverse expertise in VW's uses, participatory practices, and user research, ensuring a multifaceted evaluation of the tools presented. Unlike traditional breakout sessions, this workshop adopted a **collective roleplay approach**. All participants engaged in **each of the 8 VW co-creation journeys**, one after the other, over the course of the session. This structure was specifically designed to:

- Maximize exposure to the full range of tools in the **OPENVERSE Toolkit**
- Enable comparative evaluation across different VWs and scenarios
- Stimulate cross-sectoral reflections and discussions.

This format allowed each participant to observe and assess how tools performed across different **narrative-based scenarios, design phases, and VW affordances**—providing rich and layered feedback that informed the overall evaluation process.

3 CO-CREATION JOURNEY LOGIC

Each VW was associated with a specific object of co-creation—for example, a youth civic app, a collaborative planning tool, or a digital music exhibition. These were carefully designed to align with the affordances and social dynamics of the selected VW.

For each VW, a full co-creation scenario was developed, structured around the four phases of the Double Diamond design framework: Discover, Define, Develop, and Deliver.

Within each phase, participants were guided through **1 to 3 tools** from the OPENVERSE Toolkit. These tools were presented through a **scripted visual and narrative walkthrough**, designed as a **roleplay scenario** in which participants were invited to act as if they were part of the co-creation process described in the use case. The journey logic was structured to simulate how the tools would be applied step-by-step in real immersive settings—highlighting their function, sequencing, and expected outputs.

This approach was designed by the POLIMI team, drawing on the insights and gaps identified during **Workshop 1**, in order to ensure that each tool was presented not in isolation, but as part of a coherent and realistic co-design flow. The narrative framing helped participants experience the **practical logic of tool use**, better evaluate their relevance, and reflect on the collaborative dynamics they enable in VWs.

4 TIMELINE AND FORMAT

The session lasted **3.5 hours** and was structured as an in-person, hands-on, immersive walkthrough of 8 co-creation journeys in as many VWs. It was held on 3 September 2025, from 2.00 pm to 5.30 pm CET, during EuroXR 2025 in Winterthur.

Within each VW chapter, participants experienced:

1. Each chapter began with a **brief immersive introduction**, inviting participants to imagine themselves as co-creators within a specific context. This introduction was followed by a short **presentation of the selected VW**, highlighting its core features and affordances, and an overview of the **use case scenario** defined for that environment—for example, "Let's imagine we are tasked with designing a digital art exhibition in Spatial...". This introduction provided the narrative frame for the following journey.
2. A **step-by-step walkthrough** of a complete **co-creation journey** across the four Double Diamond phases: Discover, Define, Develop, Deliver.
3. **6 to 8 tools** from the OPENVERSE Toolkit, applied within the journey and demonstrated with visual examples and narrative explanation.
4. A **live assessment and open feedback** moment, using **Wooclap** for quantitative scoring and open-ended insights, and a **collective commenting space** for reflections and parallel comments. In parallel, there was facilitated oral discussion to deepen shared understanding and gather reactions.

This **VW-based chapter structure** allowed participants to explore all **eight VWs** sequentially, gaining insight into how co-creation tools perform across diverse immersive settings. Through each journey, participants were able to observe and compare how different tools supported collaboration, engagement, and ideation within the unique spatial and interactional affordances of each VW.

Featuring **1 to 3 tools per phase**, aligned with the **Double Diamond phases**, each co-creation journey presented a realistic, scenario-driven use case. Collectively, the workshop covered all 48 tools in the OPENVERSE Toolkit, ensuring full methodological exposure. However, to reflect tool adaptability across contexts, some tools were **intentionally used more than once**—either in different design phases or in multiple VW co-creation journeys. As a result, the total number of **tool applications** across the workshop was 54, slightly exceeding the number of unique tools.

The table below presents the distribution of tools per VW and phase, summarising the structure and coverage of the eight co-creation journeys.

VW	Object of co-creation / Use case scenario	Phase	Order	Tool	COUNT
Arthur	A co-designed roadmap for circular innovation in urban logistics	Discover	1	Service Safari	7
			2	Problem e Framing	
		Define	3	Mapping journeys	
		Develop	4	Innovative Brainstorming	
			5	Service Image	
		Deliver	6	Investigative rehearsal	
			7	Service Prototype	
Engage	An immersive simulation for designing an AI-driven	Discover	1	Cultural probes	8

VR	onboarding experience for first-year university students		2	Ecosystem Map	
			3	Envisioning the Future	
		Define	4	Co-creating journey maps	
		Develop	5	AI Functionalities Cards	
			6	Concept Walkthrough	
			7	Ecosystem Map	
		Deliver	8	Experience Prototypes	
Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Discover	1	Jigsaw	6
			2	Envisioning the Future	
		Define	3	Co-creating Personas	
		Develop	4	User Scenarios	
		Develop	5	Rough Prototyping	
		Deliver	6	Desktop walkthrough	
Rec Room	A role-based simulation for training peer mental health support in schools	Discover	1	Sociometrics	6
		Define	2	System Map	
			3	Role Playing	
			4	Co-creative workshops	
		Develop	5	System UX Map Agent Journey	
		Deliver	6	Desktop system mapping (a.k.a. Business Origami)	
Resonite	A gamified youth campaign to foster civic engagement in local governance	Discover	1	Social Network Analysis	8
			2	Open Space	
		Define	3	System Map	
			4	Emotional Journey	
		Develop	5	Journey ideation with dramatic arcs	
			6	Human Agent Journey	
		Deliver	7	Service Blueprint	
			8	Emotional Journey Feedback	
Sansar	An immersive exhibition on digital art	Discover	1	Iceberg Diagram	7
		Discover	2	Fishbowl	
		Define	3	Ecosystem Loops	
			4	Transition Journey	
		Develop	5	Integrated Journey	
		Deliver	6	Subtext	
			7	Service Prototype	
Spatial	The co-creation of a municipal app to improve public transport feedback	Discover	1	Jigsaw	6
			2	Knowledge Fair	
			3	Stakeholder Value Map	
		Define	4	Impact Journey	
		Develop	5	Ideas from future-state journey mapping	
		Deliver	6	Desktop Walkthrough	
VRChat	A speculative model for inclusive and smart urban mobility futures	Discover	1	Stakeholder Map	6
			2	Knowledge Café / Round Table Sessions	
		Define	3	System scenario	
		Develop	4	Integrated Journey	
			5	Future Backcasting	
		Deliver	6	Rehearsing digital services	
Total tools					54

4.1 EVALUATION QUESTIONS

After each co-creation journey, participants evaluated the experience based on the following structured questions:

1. How well do the presented tools support multiple participants in co-creation in Virtual Worlds? (Support to co-creation)
2. How effectively do the tools support engagement and shared decision-making? (Support to decision-making)
3. How easily can the tools be adapted to different co-creation scenarios? (Adaptation potentiality)
4. How do you rate the innovation potential of the solution generated through this co-creation journey? (Innovation potential)
5. Overall, how useful are the tools for supporting co-creation in your domain? (Relevance to domain)

Participants could respond **via Wooclap**, allowing both quantitative data collection and qualitative feedback. Scores and comments were reviewed during the oral wrap-up for each chapter.

5 EVALUATION AND RESULTS

To evaluate the **applicability and perceived value** of the OPENVERSE co-creation tools as presented through the immersive journeys, participants were invited to assess each scenario using **Likert-scale questions** (1 = low/none, 5 = high). Importantly, the evaluation focused **not on the VWs themselves**, but on the **tools as described through the narrative-based co-creation scenarios** designed for each VW. Each co-creation journey was evaluated across the five dimensions described above by the participants to the workshop (n. 29).

Below results with Average evaluation scores (1 = Low / None, 5 = High) per VW co-creation journey and assessment dimension (evaluation of tool potential as presented in the scenario-based journeys).

	Q1. Support to Co-creation	Q2. Support to Decision-making	Q3. Adaptation potentiality	Q4. Innovation potential	Q5. Relevance to domain
VW hosting co-creation journey					
Arthur	4.22	3.78	3.67	3.60	3.80
Engage VR	3.63	3.50	3.44	3.78	3.44
Resonite	3.67	3.48	3.50	3.55	3.52
Fortnite	3.71	3.75	3.50	4.14	4.00
Rec Room	4.13	3.88	3.53	4.27	3.81
Sansar	3.67	3.63	3.35	4.06	3.07
Spatial	4.25	3.89	3.67	4.22	3.88
VRChat	3.63	3.71	3.75	4.13	3.86

* 1=Low to none, 5 = High.

Arthur

Arthur's journey was one of the most balanced, with high Support to Co-creation (4.22) and Relevance to Domain (3.80), showing that participants found the overall sequence of tools clear, inclusive, and relevant to professional contexts. Slightly lower ratings for Innovation Potential (3.60) suggest that while the journey was well-structured, it could have benefited from stronger disruptive or exploratory elements to generate novel outcomes. Adaptation Potential (3.67) indicates moderate transferability to other contexts, though not universal.

Engage VR

The co-creation journey in Engage VR was rated as moderately effective across all dimensions. Support to Co-creation (3.63) and Innovation Potential (3.78) were the strongest aspects, reflecting good engagement and a coherent tool sequence. However, lower scores in Adaptation (3.44) and Relevance to Domain (3.44) suggest the journey might have felt too specific or lacking in cues for broader applicability. Feedback implies that while the tools "made sense" within the scenario, they weren't perceived as easily portable to other sectors or problems.

Resonite

The Resonite journey received consistent mid-range scores, with most dimensions scoring between 3.48 and 3.67. Participants generally appreciated the scenario's immersive and social nature, with Support to Co-creation (3.67) slightly leading. The lower Decision-making score (3.48) indicates the journey may have been more oriented toward expression and ideation than structured convergence. The design could benefit from more visible transition moments between divergent and convergent phases to support clearer shared decision-making.

Fortnite

Fortnite's co-creation journey stood out in terms of Innovation Potential (4.14) and Relevance to Domain (4.00), showing that participants found it especially strong in triggering creative, impactful ideas that could be applied in their own work. Support to Co-creation (3.71) and Decision-making (3.75) were also solid, affirming the scenario's ability to channel collaboration through engaging formats. The slightly lower Adaptation Potential (3.50) suggests that while compelling, the journey may have seemed tightly tailored to its Gen-Z gamified framing.

Rec Room

Rec Room received some of the highest ratings overall, especially for Innovation Potential (4.27) and Support to Co-creation (4.13). Participants saw the journey as dynamic, engaging, and rich in collaborative opportunities. Relevance to Domain (3.81) was also high, pointing to strong applicability beyond the specific workshop context. Adaptation (3.53) and Decision-making (3.88) suggest that while the journey was impactful, there's room to better support convergent processes or clarify how to scale the tools beyond the scenario used.

Sansar

Sansar's journey was perceived as highly creative but more niche, with a strong Innovation Potential score (4.06) and relatively lower Relevance to Domain (3.07). This implies that the scenario—focused on designing a digital art exhibition—was appreciated for its imaginative scope, but didn't resonate broadly in terms of applicability. Support to Co-creation (3.67) and Decision-making (3.63) show a solid co-creation structure, though Adaptation (3.35) was the lowest among all VWs, suggesting the journey would benefit from clearer guidance on how tools can be applied in other sectors or environments.

Spatial

Spatial achieved the highest overall scores, particularly in Support to Co-creation (4.25), Innovation Potential (4.22), and Decision-making (3.89). These results suggest that the tool sequence and narrative were highly effective in enabling structured, engaging, and innovative collaboration. Adaptation (3.67) and Relevance (3.88) confirm that participants saw the journey as broadly transferable and meaningful for their own contexts. This co-creation journey was among the most universally appreciated in terms of both structure and potential impact.

VRChat

VRChat also scored strongly, with Adaptation Potential (3.75), Innovation Potential (4.13), and Relevance to Domain (3.86) reflecting a successful scenario in terms of flexibility, creativity, and real-world usefulness. Decision-making (3.71) and Support to Co-creation (3.63) were slightly lower, suggesting that while the tools showcased a compelling speculative vision, the journey may have lacked structured moments of shared evaluation or convergence. Still, it was well received as a platform for exploring future-oriented ideas in participatory ways.

5.1 CROSS-VW INSIGHTS FROM THE ASSESSMENT

The overall assessment confirms that the **OPENVERSE Toolkit** is perceived as a **useful and adaptable resource** for organising co-creation in VWs, with particularly high appreciation for its **innovation**

potential and contextual **suitability to immersive settings**. Across all journeys, participants rated the tools as **generally effective in supporting co-creation** (average scores above 3.6 out of 5 in most VWs), and found them relevant to their own domains, especially when clearly embedded in realistic scenarios (e.g. Rec Room, Spatial, Fortnite).

The **ease of adaptation** received the most modest scores, highlighting a perceived need for **stronger guidance or customisation pathways** to help users apply the tools beyond the specific narrative scenarios explored during the workshop. However, this did not detract from the tools' perceived **potential for generating innovation**. In all eight journeys, the toolsets chosen were considered to support indeed collaboration towards **creative, novel solutions**, particularly when paired with immersive features such as embodiment, spatial collaboration, and role-playing.

Importantly, the results confirm that the **immersive affordances of VWs can enhance co-creation** when the tools are thoughtfully sequenced, carefully adjusted to the VW setting, considering its affordances, thus contextually grounded, and oriented toward participatory engagement. The experience validated the importance of **scenario-based framing**, not only to make the tools understandable, but also to demonstrate their **functional value in real-time collaboration and speculative design**. This positions the OPENVERSE Toolkit as a strong foundation for co-creation and co-design, while also pointing to future refinements aimed at increasing guidance through examples, for supporting flexibility and sectoral applicability.

6 KEY TAKEAWAYS

- The second co-creation workshop demonstrated that **complete co-creation journeys**, when well-designed and embedded in narrative contexts, can effectively showcase the potential of the OPENVERSE Toolkit in immersive environments.
- Evaluation scores confirm that participants found the journeys **useful, engaging, and applicable to their domains**, with most VWs receiving average ratings between 3.5 and 4.3 across all five dimensions.
- While there was no tool-by-tool assessment, the journeys offered a realistic and scenario-based understanding of how tools can be **sequenced, adapted, and experienced** in VWs — a format that was positively received by experts and practitioners.
- The best-rated journeys (e.g. Rec Room, Spatial, and Fortnite) suggest that **clarity of narrative, diversity of tools, and contextual relevance** are key to achieving impact. These journeys effectively conveyed how tools can support both collaborative exploration and design convergence.
- **Adaptation potential** scored slightly lower across all journeys, pointing to a need for better guidance on how co-creation journeys — and the tools they contain — can be **transferred across domains or customized to new settings**.
- The immersive roleplay format demonstrated instrumental in helping participants visualise the **logic of co-creation** and evaluate how the tools could function in practice. This reinforced the importance of pairing each tool with a **strong scenario narrative** and **clear phase-based logic**.

7 SUGGESTIONS FROM EXPERTS AND PARTICIPANTS

In addition to structured evaluations, participants were invited to share open comments and reflections throughout the workshop. These insights offer valuable guidance for refining the toolkit and enhancing future applications of co-creation in VWs. While the evaluation concerned the overall co-creation journeys, many suggestions point to **aspects of tool integration, contextual clarity, and implementation feasibility**:

- **Clarify tool–platform integration.** Several participants asked for greater specificity on **how the toolkit’s tools could be technically or procedurally embedded** in the environments presented. This suggests the need for more examples, implementation tips, or even platform-specific guides to help transition from scenario to practice.
- **Map stakeholder involvement per tool.** One participant suggested that the toolkit should indicate which **stakeholder perspectives** (e.g. citizens, service managers, technical teams) are best suited for engaging with each tool. This could enhance journey design by encouraging more balanced or inclusive role distribution during co-creation.
- **Identify high-potential tool–VW matches.** Experts noted that some co-creation journeys seemed **particularly well aligned with the affordances** of the VW in which they were hosted. This observation supports the idea of building a **mapping or recommendation** layer in the toolkit — highlighting which tools or tool combinations tend to work better in which VWs.
- **Flag tools with high technical requirements.** Feedback also pointed out that certain tools — even if valuable conceptually — may be **harder to implement in immersive settings** due to technical complexity (e.g. Ideas from future-state journeys vs Impact Journey in Spatial). This highlights the importance of flagging tools with **higher facilitation or digital implementation requirements**.
- **Add AI-enhanced tool support.** One participant noted the potential of **combining AI and co-creation in VWs**, such as through intelligent assistants or tool-based guidance embedded in the environment. This suggests an opportunity to extend the OPENVERSE Toolkit with **AI-supported functionalities** in future iterations.
- **Consider tool sequencing.** Some participants reacted more strongly to tools presented later in the journey. This may imply that **tool order matters**, and that starting with simpler or more relatable tools could help build trust and momentum toward more complex ones.

These suggestions highlights the importance of framing the OPENVERSE Toolkit not merely as a collection of methods, but as a flexible repository of tools designed for tailoring and adaptation based on the specific context in which co-creation occurs—one that supports tools continuous adjustment to better fit specific and varied purposes, user needs, design objectives, usage scenarios, and the unique affordances of different VWs.

8 REFLECTIONS AND RECOMMENDATIONS

The second co-creation workshop offered a fundamental opportunity to observe how a diverse group of experts, designers, and domain practitioners interacted with the OPENVERSE Toolkit when embedded in immersive, narrative-driven journeys. The experience highlighted several key reflections and actionable recommendations for further developing the toolkit and supporting its adoption in VW co-creation processes.

8.1 LESSONS LEARNED

While many tools were conceptually appreciated, their transferability to new contexts (as reflected in the lower adaptation scores) often depended on how clearly their purpose and application were demonstrated during the journey. Tools that were well framed within a relatable scenario (e.g. Rec Room's role-based simulation) were seen as more applicable across domains.

Tools that offered clear user roles, expected outcomes, and intuitive activities were more easily understood and evaluated. Overly abstract or composite tools tended to require more explanation or facilitation to be fully appreciated.

The same tool has been perceived as very different depending on the VW. For example, tools involving movement, staging, or spatial mapping benefited from environments that support embodiment and free interaction (e.g. Spatial, Rec Room), while highly conceptual or visual tools needed clearer translation when placed in less expressive or more presentation-oriented spaces (e.g. Engage VR).

8.2 RECOMMENDATIONS FOR HANDBOOK DEVELOPMENT

The second co-creation workshop provided valuable input to guide the ongoing evolution of the OPENVERSE Handbook. While the current version is already aligned with strong design values—clarity, inclusivity, adaptability—several insights emerged from participant feedback and facilitator observations that suggest areas for refinement and enhancement. These recommendations aim to support future iterations of the Handbook as a practical companion for immersive co-creation in diverse VW contexts.

The positive response to scenario-based co-creation journeys reinforced the importance of framing tools around clearly defined objectives, domains, and user needs—an approach already emphasized in the Handbook's guidance on setting co-creation aims. The Double Diamond structure, used to organize both the toolkit and the workshop experience, proved effective in supporting participant orientation and tool sequencing, confirming its continued relevance as the backbone of the methodology. The workshop also underscored the importance of selecting VWs based on their specific affordances and alignment with workshop goals—a principle reflected in the Handbook's multi-criteria framework for VW selection. Moreover, the Handbook's attention to adapting tools for immersive use was echoed in the workshop's successful application of tools across diverse environments, supporting the need to retain its focus on tool flexibility and spatial reinterpretation. Finally, the emphasis on inclusive facilitation, participant onboarding, and ethical engagement—already prominent in the Handbook—proved foundational for enabling meaningful collaboration in immersive settings. These observations confirm the robustness of the Handbook's structure and support its continued use as a flexible, practice-informed framework for immersive co-creation.

ANNEX

Full Excel file with co-creation journeys (tool, script, narrative, etc.)

VW	Object of Co-Creation and Description	Phase	Order	Tool	Short Description	Description	Script (what to narrate)
Arthur	A co-designed roadmap for circular innovation in urban logistics	Discover	1	Service Safari	Service Safari immerses participants in avatar-led user journeys to capture first-hand service experiences.	Service Safari immerses designers in first-person explorations of a service using avatar-led autoethnography within virtual worlds. Participants navigate key touchpoints—booking, service delivery, support—experiencing each interaction exactly as a customer would. As they move through the environment, they capture contextual insights via spatial annotations, voice memos, and reflective prompts triggered at meaningful moments.	Participants start in a basic delivery request scene. One avatar simulates a citizen trying to schedule a bulky waste pickup. As the scenario unfolds through hand-off points, avatars trigger reflective prompts—voice tags like “unclear timing” or “missed bin location” hover beside icons, followed by vocals to better explain the problems encountered. Others join in as warehouse workers, scanning items or confirming delays. Observations are recorded spatially and form the basis of a debrief where the group tags systemic gaps and logs patterns in Arthur’s interactive wall canvas.
Arthur	A co-designed roadmap for circular innovation in urban logistics	Discover	2	Problem e Framing	Problem Framing uses visual mapping tools in VR to break down complex service challenges into structured, collaborative problem spaces.	Problem Framing is a visual synthesis method that defines and structures ambiguous or complex challenges. Teams collaborate in a 3D canvas to externalize problem elements—constraints, assumptions, stakeholders, and unknowns—as digital nodes or clusters. Participants drag and group digital sticky notes, icons, and shapes to represent pain points, policy constraints, technical uncertainties, and user needs.	In a spacious circular workspace, a shared logic tree is projected onto the floor. Participants—representing logistics firms, municipal authorities, and citizen advocates—take turns dropping sticky notes like “waste overflow” or “lack of reverse logistics”. As notes connect, branches emerge into clusters. Using Arthur’s quadrant matrix board, the facilitator anchors the most frequently mentioned challenges under axes labeled “Impact” and “Feasibility”, enabling real-time group prioritization through drag-and-drop.
Arthur	A co-designed roadmap for circular innovation in urban logistics	Define	3	Mapping journeys	Mapping journeys uses 3D environments to visualize service flows by connecting users, channels, and interactions across physical and digital touchpoints.	Mapping Journeys visualizes the service ecosystem around physical and digital products by creating spatial, interactive maps in VR or 3D platforms. Participants drag and connect avatars, 3D tokens, or digital artifacts to represent users, touchpoints, channels, and product interactions across layered environments.	Avatars gather on a large canvas styled like a subway system. Using draggable icons for logistics elements (e.g., pickup, sorting center, depot), they lay out a circular logistics route. Arrows are drawn to show material movement. Dynamic elements—like CO ₂ bubbles—appear as ambient visual indicators, expanding or shrinking based on environmental load. The team continuously updates routes to simulate efficiency

							improvements or citizen reuse programs.
Arthur	A collaborative brand concept for sustainable consumer electronics	Develop	4	Innovative Brainstorming	Innovative Brainstorming is a fast-paced ideation method using virtual canvases and prompts for bold concept exploration via sketching and keywords.	Innovative Brainstorming is an inclusive, fast-paced ideation technique that stimulates spontaneous thought by leveraging spatialized virtual tools and avatar-led interaction. In a VW workshop, participants converge on a shared digital whiteboard or 3D canvas, where facilitators introduce provocations, constraints, or stimulus cards.	The session begins in the main Arthur boardroom. Participants split into three breakout rooms, each themed: 'Modularity', 'Circular Economy Services', and 'Brand Identity'. Each space includes whiteboards and post-it clusters. One avatar sketches a modular charger on a board; another group brainstorms a repair membership model using floating keyword clouds. At intervals, keywords float into the central space where a facilitator groups and reflects on dominant themes.
Arthur	A co-designed roadmap for circular innovation in urban logistics	Develop	5	Service Image	Service Image captures the essence of a service by staging a vivid 3D scene that conveys key moments and emotional tone at a glance.	Service Image distills the essence of a service experience into a single, impactful visual snapshot within a virtual world. Designers stage a 3D scene with avatars, environmental cues, and animated highlights to convey core touchpoints and emotional tone at a glance.	On a large wall-mounted whiteboard, participants are asked to draw a "symbol of circularity." One avatar sketches a looped truck route connecting reuse hubs, while another draws a web of cooperatives. Each image is pinned to a central gallery wall. Using a guided tour format, avatars take turns explaining their metaphors, which are tagged for user resonance, clarity, and alignment with systemic values.
Arthur	A co-designed roadmap for circular innovation in urban logistics	Deliver	6	Investigative rehearsal	Investigative Rehearsal uses repeated role-play to refine services in VR, testing roles, scripts, and interactions collaboratively.	Investigative Rehearsal is a theatrical tool that uses iterative roleplay to uncover and refine service behaviors within virtual worlds. Participants embody avatars to act out scenarios—customer interactions, back-end workflows, decision points—while observers note emergent patterns and friction points. Through multiple rehearsal loops, teams adjust roles, scripts, and environment affordances in real time, testing alternative responses and process variations.	The room is transformed into a mock depot. Avatars role-play critical touchpoints: a dispatcher monitors delays; a courier completes a package exchange; a manager audits compliance. At scripted pause moments, scenes freeze and a floating annotation board appears. Participants identify miscommunications, timing issues, or role overlaps. Revised scripts are loaded and replayed to test adjustments, enabling iterative service choreography.

Arthur	A co-designed roadmap for circular innovation in urban logistics	Deliver	7	Service Prototype	Service Prototype allows teams to simulate and test interactive service components—like kiosks or mobile apps—within virtual worlds.	Service Prototype simulates real user interactions with service touchpoints in virtual environments. Designers create interactive mock-ups—digital kiosks, chatbots, mobile interfaces—and deploy them in VR or 3D worlds. Participants embody avatars to engage with prototypes as they would in real life: querying a virtual assistant, placing an order through a mock interface, or interacting with augmented customer support.	Participants walk through a fully mocked-up logistics experience. A projected app interface lets an avatar simulate booking a pickup. A nearby pop-up kiosk enables another to scan a package. Others role-play edge cases—damaged items, confused users, system failures. Voice annotations and red flag markers are dropped onto the UI or scene. After each scenario, the team discusses adjustments, looping insights into the roadmap for final validation.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Discover	1	Cultural probes	Cultural probes distribute reflective prompts—like tokens, journals, or mood objects—in user spaces to gather personal insights.	Cultural Probes are stimuli-based design research tools that invite participants to document personal experiences, contexts, and thoughts through artifacts such as postcards, diaries, or in-world interactive objects. In immersive VW environments, designers distribute digital probes (VR postcards, 3D tokens, prompts) into user spaces.	Avatars enter a virtual campus lounge and pick floating 'probe cubes' that invite them to share their biggest onboarding surprises, fears, or unknowns. They drop symbols—like a locked door or a glowing map—into a shared space. Voice diaries capture memories of their own first days at university. The probes form an ambient wall of stories, setting the stage for shared empathy.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Discover	2	Ecosystem Map	Ecosystem Map enables teams to build a 3D network of stakeholders, systems, and flows that define a service's operational ecosystem.	Ecosystem Map portrays every entity, flow, and relationship that defines a service's surrounding ecosystem in immersive three-dimensional space. Avatars or 3D tokens represent users, partners, suppliers, technologies, and environmental factors, while animated streams trace value exchanges, information channels, and resource movements.	In a digital twin of the university, participants place icons for actors—'student portal', 'academic advisor', 'housing office', 'AI chatbot'—onto a virtual map. Lines trace how a student interacts with each during onboarding. Gaps or pain points (e.g., "confusing email thread") flash as red dots. A facilitator guides the group in adjusting flows to reduce overload and fragmentation.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Discover	3	Envisioning the Future	Envisioning the Future enables teams to build imagined future worlds in VR and explore ideal outcomes collaboratively.	Envisioning the Future is a collaborative scenario-building tool that invites teams to imagine plausible worlds three to six years ahead within virtual environments. Participants embody avatars in detailed VR or 3D spaces, exploring future success states—streamlined operations, empowered customers, sustainable ecosystems.	In a futuristic version of campus, avatars co-build scenes showing ideal onboarding experiences—e.g., AI-guided campus tours, voice assistants for bureaucratic forms, or peer-matching lounges. Floating annotation boards let players explain how each imagined service would feel. The room glows brighter as more ideas are added, encouraging forward-thinking and shared aspiration.

Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Define	4	Co-creating journey maps	Co-creating journey maps lets participants build detailed user journeys in VR, collaboratively mapping actions, pain points, and emotions using avatars and shared 3D timelines.	Co-creating Journey Maps harnesses the collective expertise of invited participants to collaboratively construct detailed customer journeys within immersive virtual environments. Participants embody avatars representing diverse user roles and pool first-hand insights, documenting touchpoints, pain points, emotional states, and backstage processes along a shared 3D timeline.	On a curved 3D timeline from 'Admission Letter' to 'First Day in Class', avatars place glowing tiles for steps like 'dorm check-in' or 'getting ID card', and so on. Under each step, they add emotion symbols (excitement, confusion) and mini-videos of past experiences. The group then reorganizes the timeline to propose a better sequence and inserts AI touchpoints where needed.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Develop	5	AI Functionalities Cards	AI Functionalities Cards present modular AI features—like NLP or recommendation engines—as interactive prompts in virtual ideation sessions.	AI Functionalities Cards are a spatial ideation tool designed to spark innovation by showcasing modular AI capabilities—natural language processing, computer vision, recommendation engines, anomaly detection, and more—as tangible cards in virtual environments. Participants navigate VR or 3D workspaces where avatars draw from a digital deck of functionality cards, combining and placing them along service journeys or ecosystem maps.	In an ideation space with floating decks, participants drag AI functionality cards—'FAQ bot', 'adaptive scheduler', 'language detection'—onto a canvas labeled with user needs. One avatar proposes using an NLP bot to translate onboarding steps for international students. Another builds a flow from 'AI nudges' to 'event recommendations'. Discussions spark ethical reflection and usability mapping.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Develop	6	Concept Walkthrough	Concept Walkthrough guides users through step-by-step service concepts in VR, enabling feedback at each stage of interaction.	Concept Walkthrough is a guided, immersive, step-by-step 3D or VR tour that presents a service concept through sequential stages, enabling stakeholders to experience proposed features and flows in context. Creators animate avatars or interactive hotspots to demonstrate each touchpoint—from discovery to service completion—while participants observe, comment, and suggest ongoing improvements in real time.	A simulated onboarding journey plays out inside a virtual portal interface. Players navigate a first-year student's flow: sign-up, finding classes, housing guide. At each stage, the group pauses and gives feedback using floating red or green markers. "What if this dropdown had a voice assistant?" one player asks, triggering an instant prototype revision and replay.

Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Develop	7	Ecosystem Map	Ecosystem Map enables teams to build a 3D network of stakeholders, systems, and flows that define a service's operational ecosystem.	Ecosystem Map portrays every entity, flow, and relationship that defines a service's surrounding ecosystem in immersive three-dimensional space. Avatars or 3D tokens represent users, partners, suppliers, technologies, and environmental factors, while animated streams trace value exchanges, information channels, and resource movements.	The earlier map is now layered with new services: AI tools, peer connectors, gamified orientation tasks for gaining in-campus benefits while supporting other students. Avatars simulate interactions across actors—testing how a student request flows from chatbot to office to resolution. Animations reflect delays, dead ends, or duplicate efforts. Teams identify friction points and iterate on better handoffs.
Engage VR	An immersive simulation for designing an AI-driven onboarding experience for first-year university students	Deliver	8	Experience Prototypes	Experience Prototypes simulate key service moments in VR—such as onboarding or checkout—to test usability and interaction design.	Experience Prototypes are interactive simulations of key service touchpoints within virtual worlds. They let teams rapidly prototype and test specific moments in a journey—such as checkout kiosks, support chatbots, or onboarding flows—by building high-fidelity mock-ups in VR or 3D spaces.	Participants act out key moments of onboarding—booking campus tours, receiving alerts, or asking AI for help. The environment reacts: a buzzy help desk, a digital orientation fair, or a quiet dorm check-in. Real-time emotional feedback is collected via emoji tags and voice notes. Teams watch recordings to refine tone, timing, and transitions in the onboarding experience.
Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Discover	1	Jigsaw	Jigsaw divides a challenge into parts, assigns each to a team, and reconvenes in VR to reassemble findings into a whole picture.	Jigsaw is a cooperative learning strategy adapted for virtual worlds that divides a complex service challenge into interlocking “puzzle pieces.” Small expert teams explore an assigned component—such as user research, technology integration, or policy constraints—and develop deep insights. Avatars reconvene in a shared 3D space to assemble findings, linking visual tokens, diagrams, and narratives to complete the holistic picture.	Four squads land on themed creative islands: ‘Materials’, ‘User Habits’, ‘Corporate Practices’, and ‘Cultural Myths’. Each group builds scenes with props and NPCs—like waste-processing games or influencer lounges. Later, they regroup at a central summit island to present findings using animated sequences and floating storyboards.
Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Discover	2	Envisioning the Future	Envisioning the Future enables teams to build imagined future worlds in VR and explore ideal outcomes collaboratively.	Envisioning the Future is a collaborative scenario-building tool that invites teams to imagine plausible worlds three to six years ahead within virtual environments. Participants embody avatars in detailed VR or 3D spaces, exploring future success states—streamlined operations, empowered customers, sustainable ecosystems.	On one island, players build representations of the future as they would like to have them. Players form small teams and claim an empty island. Some choose to build utopias—high-tech recycling hubs, clean energy markets, digital repair cafés. Others create dystopias or satirical worlds filled with trash mountains or broken gadgets. Each team then tours the others' islands, narrating their imagined futures while discussing what behaviors, systems, or choices led there. Feedback is shared via emotes or voice chat.

Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Define	3	Co-creating Personas	Co-creating Personas involves avatars representing user types as participants co-design persona profiles through shared experiences, motivations, and needs.	Co-creating Personas is a collaborative method that leverages the collective expertise of invited participants to develop rich, context-driven user archetypes and associated journey maps or service blueprints in virtual worlds. Workshop attendees assume avatar roles representing target segments and co-design persona profiles by contributing real-world insights, behaviors, motivations, and pain points.	Each player assumes a persona—‘eco-activist’, ‘influencer’, etc. —and builds a personal zone. One sets up a cluttered streamer room, another a serene repair café. As they explore each other’s builds, players narrate motivations and place emoji markers near design elements that motivate or discourage behavior change.
Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Develop	4	User Scenarios	User Scenarios bring imagined service journeys to life with avatars enacting step-by-step narratives.	User Scenarios bring envisioned service experiences to life through compelling narratives that follow a user’s journey in context. In a virtual 3D or VR environment, avatars embody personas and enact stories that illustrate goals, motivations, and pain points at each stage of interaction—discovery, decision, execution, and reflection.	Players form creative squads and build themed play zones across an island: one simulates discovering an eco-mission on social media, another reenacts a digital clean-up challenge, and a third creates a pop-up repair quest. As they embody user personas, players walk through each zone and narrate what draws them in, confuses them, or feels off-brand. Scenes are revised live—adding visual hooks, clearer prompts, or more rewarding feedback cycles—based on collective reactions.
Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Deliver	6	Desktop walkthrough	Desktop Walkthrough guides avatars through service steps in VR, allowing real-time feedback on usability and emotional flow.	A Desktop Walkthrough is an immersive, personalizable simulation that brings end-to-end customer experiences to life in virtual 3D or VR environments. Participants embody personas and navigate service journeys—onboarding, troubleshooting, fulfillment—while observers pause and adjust scenarios in real time. This mini-theater format fosters deep empathy, uncovers hidden pain points, and accelerates co-design by enabling live feedback and iterative branching.	Final branded assets—slogan walls, badge icons, campaign colors—float in sequence along a sky path. Players walk through, using voice chat and emoji markers to flag confusing visuals, off-tone messaging, or weak engagement elements. Feedback is clustered live for action.

Fortnite	A branded immersive experience to promote e-waste awareness and circular habits among Gen Z players	Develop	5	Rough Prototyping	Rough Prototyping lets teams quickly mock up service ideas in VR using basic 3D shapes and annotations to test concepts in real time.	Rough Prototyping is a rapid, low-fidelity method for mocking up service ideas using simple virtual assets available on demand in VR or 3D platforms. Teams embody avatars that assemble, rearrange, and annotate digital placeholders—such as basic shapes, sketch overlays, or interactive widgets—to explore concepts in real time.	Players are dropped into a blank creative island. One team builds a prototype junkyard with repair zones. Another codes a 'trash to treasure' quest. Quick mockups are tested live, allowing playthrough and emote-based feedback.
Rec Room	A role-based simulation for training peer mental health support in schools	Discover	1	Sociometrics	Sociometrics maps group dynamics using avatar placement, proximity, and interaction to reveal influence and trust patterns.	Sociometrics uses embodied spatial modelling in virtual worlds to map social dynamics, influence patterns, and group interactions. Participants assume avatar roles and position themselves within 3D spaces to represent relationships—cooperation, authority, trust—connecting with lines or proximity triggers that reveal network density and communication pathways.	In a looped series of micro-scenes—hallway chats, missed lunch invites, awkward silence at lockers—avatars roleplay school life. At any moment, players raise emoji paddles to signal emotional resonance: tension, ease, confusion. Over time, a heatmap appears on the wall, pulsing brighter where discomfort peaks. These signals prompt group reflection.
Rec Room	A role-based simulation for training peer mental health support in schools	Define	2	System Map	The System Map helps participants visualize all actors, processes, and resources in a service using a shared 3D canvas of interconnected elements.	System Map is an immersive spatial tool for visualizing all actors and components involved in service delivery within virtual worlds. Designers create a shared 3D canvas where avatars or tokens represent users, frontline staff, support systems, digital platforms, and environmental elements.	Using Rec Room's wire tools and logic props, participants collaboratively draw a systems diagram of peer support. Icons like 'counselor', 'incident report', and 'peer circle' are placed on a shared wall. Lines connect them, pulsing to simulate flow or lag. A delayed 'parental contact' node sparks discussion on communication bottlenecks.
Rec Room	A role-based simulation for training peer mental health support in schools	Define	3	Role Playing	Role Playing brings services to life as avatars enact real or imagined user scenarios in immersive environments.	Role Playing brings a hypothetical service to life through avatar enactment in virtual worlds. Users assume persona roles—customers, frontline staff, or partners—and act out journey scenarios in immersive VR or 3D environments. As avatars, participants navigate scripted or spontaneous interactions, responding to prompts, making decisions, and adapting to system feedback.	Players enter a customizable room staged as a school hallway. One avatar acts as a distressed student, another as a peer responder. Their conversation unfolds with others observing. At key moments, the group pauses to adjust tone, test alternative scripts, or change the setting.

Rec Room	A role-based simulation for training peer mental health support in schools	Define	4	Co-creative workshops	Co-creative Workshops bring users together in virtual spaces to build personas, sketch services, and co-develop ideas.	Co-creative Workshops leverage the expertise of invited stakeholders to jointly develop rich personas and service artifacts within virtual worlds. Participants adopt avatar identities aligned with target segments and contribute real-world observations, motivations, behaviors, and pain points through interactive exercises. As the group clusters and refines characteristics, they animate personas in scenario enactments to validate assumptions and reveal hidden needs.	Participants rotate through three themed rooms—'chill zone', 'peer corner', and 'counseling board'. In each, they add props, draw concepts, or stage short skits. One team designs a self-check poster; another builds a peer-to-peer hotline booth. Voice notes and annotations capture the essence of each space. Facilitators gather highlights into a shared canvas.
Rec Room	A role-based simulation for training peer mental health support in schools	Develop	5	System UX Map Agent Journey	System UX Map Agent Journey tracks how AI systems and humans interact, visualizing data flows and decision points across a spatial timeline.	System UX Map Agent Journey visualizes AI/ML system interactions and human collaboration within virtual worlds. Participants guide avatars representing data pipelines, models, and human operators across a spatial timeline that highlights when core AI elements—data ingestion, feature engineering, model training, inference—are generated and required.	In a simulation room, players take on roles: one as peer mentor, another as student, a third as school admin. As a scene unfolds—e.g., reporting a concern—UI-like props (cards, message alerts) appear. Each player sees different info or decision options. At reflection zones, teams compare journeys, identifying mismatches or friction points.
Rec Room	A role-based simulation for training peer mental health support in schools	Deliver	6	Desktop system mapping (a.k.a. Business Origami)	Desktop System Mapping (Business Origami) uses 3D tokens and spatial layouts to model stakeholder relationships and workflows collaboratively.	Desktop System Mapping, known as Business Origami, is a tactile method for visualizing complex value networks by arranging simple paper cutouts—or, in virtual worlds, draggable avatars and 3D tokens—on a shared collaborative workspace. Participants represent key people, locations, channels, and touchpoints with standardized symbols, connecting elements to reveal relationships, dependencies, and information flows.	On a shared virtual table, labeled props—'referral form', 'mentor handbook', 'parent consent'—are arranged into protocol flows. Players test different orders: fast track vs. comprehensive. Stickers or emojis mark role gaps or overload points. The team then reflects on how well the flow supports safety, trust, and responsiveness.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Discover	1	Social Network Analysis	Social Network Analysis visualizes connections between users, groups, and systems in a 3D network of relationships.	Social Network Analysis visualizes the web of relationships and knowledge flows among individuals, teams, and organizations within a service ecosystem. In a virtual world, nodes—avatars representing people or groups—are positioned in 3D space, with linkages animating communication channels, collaboration ties, and information exchanges.	Youth avatars appear inside a glowing sphere. Each one draws connections to nodes labeled 'Instagram poll', 'school club', or 'sports group'. As more links form, the network dynamically lights up. A facilitator visualizes central hubs and isolates. The group discusses where engagement is strong and where new outreach is needed.

Resonite	A gamified youth campaign to foster civic engagement in local governance	Discover	2	Open Space	Open Space lets participants set their own discussion topics in shared VR plazas, then form spontaneous working groups.	Open Space is a participant-driven agenda creation method that harnesses the self-organizing capacity of virtual-world attendees. In a shared 3D plaza or VR amphitheater, avatars propose topics by posting spatial markers, then gather around interest hubs to co-create content and agendas.	Floating topic islands rise in a public VR plaza—'education', 'climate', 'inclusion'. Youth participants step onto an island to join that conversation. Inside, they decorate/engage with the space through visuals, props, and voice notes to express personal relevance. At the end, all return to the plaza for a rotating tour of outputs from each island.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Define	3	System Map	The System Map helps participants visualize all actors, processes, and resources in a service using a shared 3D canvas of interconnected elements.	System Map is an immersive spatial tool for visualizing all actors and components involved in service delivery within virtual worlds. Designers create a shared 3D canvas where avatars or tokens represent users, frontline staff, support systems, digital platforms, and environmental elements.	On a shared board, avatars place tiles like 'school advisor', 'TikTok campaign', and 'council feedback loop' into categories. Lines are drawn to show flows and dependencies. When they drag obstacles like 'low trust' into the mix, warning symbols flash. Teams iterate layout to reduce friction and balance influence.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Define	4	Emotional Journey	Emotional Journey maps how users feel across a service timeline, using visual markers and avatar expressions to trace emotions.	Emotional Journey maps shifts in user perception and emotional valence across a service experience in a virtual world. Designers plot rising and falling emotional states along a spatial timeline using 3D curves or color-coded overlays. During scenario enactments, avatars display real-time emotional cues—gestures, facial animations, environmental feedback—which observers annotate to pinpoint stress peaks, delight moments, or ambivalence.	A large timeline floats mid-room. Avatars grab colored cards with emotions on them (blue for apathy, yellow for energy, etc) and attach them to civic experiences like 'invitation', 'first feedback', or 'public speaking', to comment what they think about it. After mapping, they share reflections.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Develop	5	Journey ideation with dramatic arcs	Journey ideation with dramatic arcs maps user experiences using story curves like rising action and climax to design emotional engagement.	Journey Ideation with Dramatic Arcs is a co-creation method that applies narrative structures to service design in virtual worlds. Teams leverage classic dramatic arcs to outline user journeys, mapping emotional peaks and transitions across touchpoints. In immersive 3D or VR environments, participants embody avatars to spatialize journey stages, visually enact pivotal moments, and explore plotlines.	A dramatic arc appears on a vertical VR wall. Avatars annotate key moments: 'recruitment', 'challenge', 'win' and advance on annotating phases like 'recruitment', 'conflict', 'turning point', and 'payoff'. Then they switch to world-edit mode, building playable game quests aligned to each phase. One group adds a roleplay debate. Another scripts a clean-up challenge with virtual prizes.

Resonite	A gamified youth campaign to foster civic engagement in local governance	Develop	6	Human Agent Journey	Human Agent Journey visualizes how a person reaches a goal, plotting each step in a virtual timeline of expectations and actions.	Human Agent Journey visualizes the step-by-step path a person takes to achieve a goal, illustrating agent, scenario, expectations, phases, actions, and insights in an immersive virtual environment. Participants embody an avatar representing the human agent and progress through journey stages—awareness, exploration, decision, fulfillment, and reflection—within a shared 3D or VR space.	In small groups, avatars simulate civic encounters. A ‘youth’ asks how to join a local council. A ‘chatbot’ avatar responds with a menu. The group tests alternate flows: adding humor, clarifying tone, or simplifying instructions. Live dialogue editing ensures the tone and timing match youth expectations.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Deliver	7	Service Blueprint	Service Blueprint helps teams co-create full-service flows on 3D canvases, showing user actions, backstage systems, and support roles.	Service Blueprint is a comprehensive mapping technique that visualizes every stage of service delivery—front-stage interactions, backstage processes, support systems, and physical or digital touchpoints—in a unified blueprint. In virtual environments, designers arrange swim-lane structures on a 3D canvas, deploying avatars to simulate customer and staff roles and animating process flows in real time.	A large blueprint hangs across the space. It is divided in main steps with icons like ‘school pitch’, ‘Instagram video’, ‘feedback form’ added to rows for youth, moderators, and institutions. Participants walk the path to simulate timing, overlap, and gaps, being asked to fill in spaces and contribute to building value. Problem areas glow red and can be annotated live for refinement; new ideas and possibilities are noted down.
Resonite	A gamified youth campaign to foster civic engagement in local governance	Deliver	8	Emotional Journey Feedback	Emotional Journey Feedback tracks user sentiment across the journey by plotting highs and lows on immersive service timelines.	Emotional Journey Feedback extends the System UX Map by overlaying users’ emotional states across every phase of their experience in virtual worlds. A continuous “emotion line” traces peaks and valleys—signaling stress points, moments of delight, and transitional shifts—plotted along a spatialized service timeline.	The group plays through a working prototype of the civic game—from discovery to voting day. As they interact, avatars drop emoji markers—: fireball = hype, cloud = confusion. Data is discussed in real time, guiding final design tweaks.
Sansar	An immersive exhibition on digital art	Discover	1	Iceberg Diagram	Iceberg Diagram visualizes surface events and deeper root causes in layered VR diagrams that show visible and hidden forces.	An Iceberg Diagram visualizes beneath-the-surface forces that shape service behaviors by layering observable events, systemic structures, mental models, and underlying paradigms in a vertical 3D canvas. Participants position avatars or tokens at different strata—the tip of the iceberg representing customer actions, the submerged mass depicting processes, regulations, cultural beliefs, and deeper worldviews.	Participants gather in a large virtual dome where a transparent 3D iceberg floats above and below a digital ocean. In small teams, they edit the top section—sculpting visible cultural trends like ‘NFT marketplaces’, ‘generative glitch’, or ‘AR filters’. Then, descending into the underwater section, they attach glowing icons labeled ‘platform bias’, ‘authorial instability’, or ‘AI aesthetics’. Story fragments emerge as holographic orbs from the iceberg’s core, triggering group discussion on deep

							cultural shifts in digital art.
Sansar	An immersive exhibition on digital art	Discover	2	Fishbowl	Fishbowl sets up layered avatar discussions where speakers rotate and listeners annotate, helping surface deeper perspectives.	Fishbowl is an interactive dialogue technique that amplifies expert knowledge and broadens group understanding through a concentric-circle setup in virtual worlds. In a central "bowl," a handful of skilled avatars discuss targeted questions while an outer ring of observers listens, reflects, and captures insights on spatial whiteboards.	Inside an amphitheater dome surrounded by digital art projections, a small group of avatars sits in the central "fishbowl" circle while others listen from the outer ring. A digital artist begins narrating their experience navigating AI-generated art. Observers view the shifting backdrop of their work while hearing their story. At designated pauses, outer-circle avatars raise their hand emote and "tap in" to the fishbowl, asking questions or adding perspective. Emotional tags (e.g., "resonates," "confused," "challenging") float into the shared space to guide thematic alignment.
Sansar	An immersive exhibition on digital art	Define	3	Ecosystem Loops	Ecosystem Loops maps out how services, users, and environments interconnect in 3D space, showing flows of value, data, and influence.	Ecosystem Loops is an immersive mapping tool that visualizes complex service ecosystems across multiple scales—users, stakeholders, partner networks, objects, and environments—within virtual worlds. Participants arrange and connect 3D tokens or avatars to represent entities and draw animated flows that trace value exchanges, information transfers, and dependencies.	Avatars hover around a virtual system map suspended in space above a stylized art network. Using drag-and-drop tools, they add nodes like 'art school', 'collector', 'funding platform', and 'social engagement'. Arrows are drawn between nodes, animating feedback loops—for example, "attention → platform visibility → creator revenue." Each connection pulses based on group consensus of impact. The team identifies tension points by highlighting areas with few or broken loops, like 'lack of mentorship' or 'algorithmic filtering'.

Sansar	An immersive exhibition on digital art	Define	4	Transition Journey	Transition Journey shows how user roles and behaviors evolve by mapping their journey across changing scenarios in immersive environments.	Transition Journey is a dynamic tool that maps and analyzes how user behavior and roles evolve over time within a service ecosystem. In virtual worlds, participants embody avatars that transition through sequential personas—novice to expert, customer to advocate—navigating branching scenarios that illustrate changing motivations, skills, and expectations.	Participants walk through a three-room gallery experience representing different audience roles. In Room 1 'Obsession', they see high-saturation, eye-catching digital displays with fast-cut videos and viral aesthetics. In Room 2 'Critique', monochrome installations and discussion prompts slow the pace. In Room 3 'Remix', avatars actively alter displayed works using remix props and toolkits. Participants adjust lighting, signage, and wall text collaboratively in each space. After the walkthrough, they vote on which transitions felt meaningful or jarring.
Sansar	An immersive exhibition on digital art	Develop	5	Integrated Journey	Integrated Journey maps the full service experience—from front-end touchpoints to backend processes—within a unified virtual blueprint.	Integrated Journey extends traditional journey mapping into a comprehensive service blueprint within virtual worlds, visualizing customer touchpoints alongside backstage processes, technology systems, and stakeholder roles. In an immersive 3D environment, designers arrange avatars, swimlanes, and interactive nodes on a shared timeline to show how front-stage interactions trigger behind-the-scenes support functions and data flows.	A prototype of the full exhibition is loaded. Avatars spawn into the lobby and proceed through interconnected rooms: a generative AI gallery, a collaborative VR graffiti wall, and a sound-reactive installation. In each zone, participants can adjust settings—like soundtrack intensity or color filters—via embedded control panels. Emotion beacons ("this clicks," "too noisy," "felt nothing") can be placed near artworks. At the end, everyone meets in a reflection room with screens replaying highlights and collected insights.
Sansar	An immersive exhibition on digital art	Deliver	6	Subtext	Subtext explores unspoken thoughts and emotions in VR roleplay, helping teams understand implicit user needs.	Subtext is a theatrical method that can reveal deeper motivations and needs by focusing on unspoken thoughts in a rehearsal session. Subtext is a theatrical method that can reveal deeper motivations and needs by focusing on unspoken thoughts in a rehearsal session.	During a live tour simulation, avatars move through curated scenes. In one space, a glitch-based portrait loops with an abstract poem; in another, an NFT wall cycles auction prices. As the tour unfolds, avatars pause and apply floating feedback tags such as "too obscure," "emotionally resonant," or "needs more context." These tags are visible to all and logged into a collaborative dashboard. Facilitators replay scenes, discuss intent vs. perception, and tweak visuals, pacing, or narration in response.

Sansar	An immersive exhibition on digital art	Deliver	7	Service Prototype	Service Prototype allows teams to simulate and test interactive service components—like kiosks or mobile apps—within virtual worlds.	Service Prototype simulates real user interactions with service touchpoints in virtual environments. Designers create interactive mock-ups—digital kiosks, chatbots, mobile interfaces—and deploy them in VR or 3D worlds. Participants embody avatars to engage with prototypes as they would in real life: querying a virtual assistant, placing an order through a mock interface, or interacting with augmented customer support.	The full immersive exhibition is launched in tour mode. A guide avatar welcomes participants in a stylized digital lobby. As the tour proceeds, visitors interact with digital art pieces—navigating sound tunnels, triggering generative animations, or co-drawing in participatory booths. At each station, participants react using floating emoji tools or gestural avatars (nods, tilts, applause). Live feedback icons hover around artworks, and voice reflections are captured in a “story bubble” at the end. A debrief lounge hosts final discussion on curation, flow, and emotional impact.
Spatial	The co-creation of a municipal app to improve public transport feedback	Discover	1	Jigsaw	Jigsaw divides a challenge into parts, assigns each to a team, and reconvenes in VR to reassemble findings into a whole picture.	Jigsaw is a cooperative learning strategy adapted for virtual worlds that divides a complex service challenge into interlocking “puzzle pieces.” Small expert teams explore an assigned component—such as user research, technology integration, or policy constraints—and develop deep insights. Avatars reconvene in a shared 3D space to assemble findings, linking visual tokens, diagrams, and narratives to complete the holistic picture.	Participants enter four themed gallery rooms labeled ‘Access’, ‘Data’, ‘UX’, and ‘Frequency’. Each group curates their space with annotated screenshots, quotes from commuters, and mapped issues. In the central atrium, all groups gather around a shared wall. They drag their tiles into a collective priority map, clustering insights to find common pain points and gaps.
Spatial	The co-creation of a municipal app to improve public transport feedback	Discover	2	Knowledge Fair	Knowledge Fair stages a virtual expo where participants showcase insights, research, or case studies at themed interactive booths.	Knowledge Fair is a virtual event platform for sharing insights from diverse experts through immersive booths, dynamic displays, and interactive presentations. In a 3D or VR expo hall, participants navigate avatar-driven pavilions themed around specific domains—data privacy, user research, policy design—and engage with multimedia panels showcasing research findings, prototypes, and case studies.	Inside a virtual expo hall, each wall hosts a “booth” on a feedback topic—e.g., ‘Elderly Experience’, ‘Live Delay Reporting’, or ‘Station Cleanliness’. Participants browse these zones as avatars, examining diagrams and voice-annotated quotes. Using floating tokens or emoji reactions, they vote on which insights should inform the next app iteration. All reactions appear in real time on a central synthesis screen.

Spatial	The co-creation of a municipal app to improve public transport feedback	Discover	3	Stakeholder Value Map	Stakeholder Value Map captures each stakeholder's core needs and values—practical, social, and aspirational.	A Stakeholder Value Map distills the core motivations and needs of each stakeholder within a service ecosystem by plotting practical, social, and higher personal values on a shared virtual canvas. Participants assume avatar roles representing users, partners, regulators, or employees and annotate a 3D map with value attributes—basic necessities, relational priorities, and dignity-driven aspirations.	Inside a minimalist town hall world, avatars stand around a circular matrix labeled 'Power' vs. 'Need'. Each participant represents a stakeholder—an elderly rider, a transit planner, a data analyst. One avatar places a "Convenience" token next to the elderly rider icon, while another adds "Predictability" to the driver. Connections between tokens glow where values align. The facilitator hovers a summary screen that displays clustering of values and asks the group to reflect: "Where do we see unbalanced attention or tension between needs?"
Spatial	The co-creation of a municipal app to improve public transport feedback	Define	4	Impact Journey	Impact Journey evaluates a service's effects across social, environmental, and economic dimensions by simulating outcomes in immersive scenarios.	Impact Journey is a highly immersive foresight tool that models and evaluates effects of a service experience across environmental, social, and economic dimensions in an interactive virtual world. Participants enact key touchpoints as avatars—customers, service personnel, suppliers—while indicators trace resource consumption, waste streams, community benefits, and carbon footprints along the timeline.	A large timeline is mounted across one gallery wall, spanning phases like 'Pre-Trip', 'Boarding', 'Ride', and 'Arrival'. Avatars place feedback cards at key points: green for positive impact, red for negative. For example, a green card under 'Live Bus Arrival' reads "Reduces stress", while a red under 'In-App Survey' reads "Too long". The group walks the wall, clusters themes, and discusses high-leverage areas.
Spatial	The co-creation of a municipal app to improve public transport feedback	Develop	5	Ideas from future-state journey mapping	Ideas from future-state journey mapping uses narrative arcs to explore speculative service experiences 3–5 years ahead.	Future-State Journey uses narrative structures to guide co-creative exploration of envisioned service experiences. Participants apply the classic dramatic arc—exposition, rising action, climax, falling action, resolution—to a future-state customer journey mapped three to five years ahead. In virtual 3D or VR environments, collaborators embody avatars to spatialize journey stages, enact critical moments, and iterate plot-driven touchpoints.	Participants spawn into a mock bus stop environment—complete with kiosks, benches, and QR feedback points. Around them are digital idea boards. Avatars sketch concepts or pin sticky notes: "Real-time feedback board", "Voice-activated help". As the lighting and crowd density shift (e.g., rush hour simulation), participants add contextual annotations like "unclear signage under stress" or "works great when calm".

Spatial	The co-creation of a municipal app to improve public transport feedback	Deliver	6	Desktop Walkthrough	Desktop Walkthrough guides avatars through service steps in VR, allowing real-time feedback on usability and emotional flow.	A Desktop Walkthrough is an immersive, personalizable simulation that brings end-to-end customer experiences to life in virtual 3D or VR environments. Participants embody personas and navigate service journeys—onboarding, troubleshooting, fulfillment—while observers pause and adjust scenarios in real time. This mini-theater format fosters deep empathy, uncovers hidden pain points, and accelerates co-design by enabling live feedback and iterative branching.	App screens are pinned to the gallery walls in a sequential flow—like storyboards. Participants move from screen to screen, tapping on pain points, recording voice notes, or using colored dots (green for clarity, red for confusion). The facilitator gathers these annotations and opens live discussion. One screen gets flagged heavily—‘Unclear button flow’—prompting redesign in the next iteration.
VRChat	A speculative model for inclusive and smart urban mobility futures	Discover	1	Stakeholder Map	Stakeholder Map plots all key actors in a service by influence, interest, and relationships using icons and spatial links.	Stakeholder Map visually arranges all actors in a service ecosystem by plotting individuals, groups, and organizations on axes of influence and interest within a shared virtual canvas. Designers place avatar tokens or 3D icons to represent each stakeholder, then draw animated links to illustrate relationships, dependencies, and communication channels.	Avatars spawn into a stylized virtual plaza at dusk. Each participant places a floating nameplate above their head—e.g., “Urban Cyclist”, “Mobility Platform CEO”, “Accessibility Advocate”, “City Planner”. Holographic icons representing stakeholder roles appear in space. Players connect these using colored lines—blue for collaboration, red for tension, green for dependency. As connections grow, the plaza fills with a glowing network map. Participants use voice chat to reflect on overlaps, absences, and power dynamics.
VRChat	A speculative model for inclusive and smart urban mobility futures	Discover	2	Knowledge Café / Round Table Sessions	Knowledge Café invites participants to rotate through themed tables, discussing issues and posting insights in shared virtual canvases.	Knowledge Café or Round Table Sessions is an avatar-led dialogue method that builds collective intelligence in virtual worlds. Participants gather at themed café tables, sharing experiences and posting digital notes on shared canvases. After a timed session, avatars rotate to new tables, carrying forward insights and weaving ideas into a knowledge web.	Participants enter four ambient lounges—each themed: “Data Justice”, “AI Routing”, “Elder Mobility”, “Public Ownership”. Five avatars gather in each. Over 10-minute segments, they engage in avatar-led discussions, seated around glowing orbs that subtly shift color with emotional intensity. After two rotations, everyone teleports to a rooftop garden under a digital sky. Avatars write key insights on glowing lanterns and release them into the sky, visualizing collective synthesis.

VRChat	A speculative model for inclusive and smart urban mobility futures	Define	3	System scenario	System Scenario lets teams simulate how services respond to disruptions like policy shifts or tech failures in virtual settings.	System Scenario is a dynamic simulation tool that models how a service ecosystem adapts and evolves under specific conditions. In a virtual 3D or VR environment, participants configure scenario parameters—seasonal demand spikes, regulatory shifts, tech failures—and watch animated system components (avatars, processes, data flows) respond in real time.	The group spawns into a futuristic city hub. Suddenly, a scene change overlays the space: rideshare strikes, AI taxi rerouting, and citizen protests unfold in real time. Avatars embody different roles—commuter, operator, regulator. As situations evolve, they react, converse, and improvise. After the simulation, they teleport into a calm debrief room where system touchpoints are marked on the wall. Using voice and emoji, they reflect on what broke, adapted, or surprised them.
VRChat	A speculative model for inclusive and smart urban mobility futures	Develop	4	Integrated Journey	Integrated Journey maps the full service experience—from front-end touchpoints to backend processes—within a unified virtual blueprint.	Integrated Journey extends traditional journey mapping into a comprehensive service blueprint within virtual worlds, visualizing customer touchpoints alongside backstage processes, technology systems, and stakeholder roles. In an immersive 3D environment, designers arrange avatars, swimlanes, and interactive nodes on a shared timeline to show how front-stage interactions trigger behind-the-scenes support functions and data flows.	Participants teleport through three interconnected scenes: (1) unlocking a shared e-scooter on a dark sidewalk, (2) struggling with payment on a smart bus interface, (3) receiving a push notification from a civic platform. In each scene, avatars interact with props (e.g., phone UI, scooter lock), logging emotional and experiential responses with voice notes or floating emoji glyphs. After the journey, a visual timeline appears where reflections are clustered and discussed.
VRChat	A speculative model for inclusive and smart urban mobility futures	Develop	5	Future Backcasting	Future backcasting explores how today's actions shape future outcomes by simulating reverse timelines in VR.	Future Backcasting is a foresight tool that reverses time to identify pathways from desired future outcomes back to present-day actions within virtual worlds. Participants embody avatars representing future stakeholders to enact scenarios in 3D or VR environments, dramatizing how emerging trends and innovations influence service evolution.	Participants begin in a circular hub with four labeled futures: Possible – Fragmented cities with private autonomous systems Plausible – AI-managed mobility with persistent equity gaps Probable – Seamless multimodal transport led by data platforms Preferred – Citizen-owned, inclusive, and regenerative systems They explore each future through guided scenarios, then return to breakout rooms to "reverse engineer" pathways from future to present, identifying key enablers like shared governance or digital literacy. Finally, all groups meet in a central space to compare timelines, vote on coherence, and reflect on trade-offs.

VRChat	A speculative model for inclusive and smart urban mobility futures	Deliver	6	Rehearsing digital services	Rehearsing Digital Services stages digital touchpoints like chatbots and apps using avatars to evaluate tone and interaction quality.	Rehearsing Digital Services is a variant of Investigative Rehearsal that prototypes digital interfaces through embodied, actor-led simulations in virtual worlds. Participants—represented as avatars—take on customer, agent, or system roles and act out conversational and transactional flows: chatbot dialogs, voice assistants, form interactions, and error recoveries.	In a modular stage designed as a city plaza, a service rehearsal begins: one avatar (citizen) submits transit feedback via voice, another (agent) responds, a third (system) updates signage. At key moments, the scene is paused. Participants step “off stage” to annotate tone, sequence, or clarity. Replays allow revision: e.g., a more empathetic tone, simpler UI, or faster notification. The scene is iterated until it feels intuitive and inclusive.
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ETHICS COMPLIANCE SIGN-OFF



ETHICS COMPLIANCE SIGN-OFF AND PUBLIC BRIEF DPIA

Deliverable:	D1.1 – Handbook of Co-Creation Methodologies (V1)
Project:	OPENVERSE – Governance and Trust in Virtual Worlds
Work Package:	WP1 – Co-Creation of Open-Source Tools for Virtual Worlds
Ethics Review Date:	28 October 2025
Reviewed by:	OPENVERSE Ethics Advisor – UNEXT Ltd

1. ETHICS COMPLIANCE SIGN-OFF

Deliverable D1.1 demonstrates full alignment with the EU Charter of Fundamental Rights and Horizon Europe ethical standards, emphasizing openness, inclusiveness, and human-centric innovation in virtual environments. Its methodology ensures that co-creation activities in Virtual Worlds (VWs) are participatory, transparent, and respectful of data-protection obligations under the General Data Protection Regulation (GDPR, EU 2016/679).

The deliverable explicitly integrates GDPR compliance provisions:

- All participants gave informed consent through templates aligned with D7.3 and D7.7 Data Management Plans.
- No sensitive or special category data (health, biometric, genetic, etc.) were collected.
- Data minimisation and pseudonymisation were systematically applied to surveys, workshop results, and creative outputs.
- Any attribution of participant names to creative works was based on written consent.
- Storage and retention follow institutional repositories of POLIMI, consistent with OPENVERSE DMP policies.

The deliverable also adheres to the AI Act (Regulation 2024/1689) principles for limited-risk systems: transparency, explainability, and human oversight. AI tools were used exclusively for proofreading, linguistic clarity, and accessibility enhancements under human supervision and without generating analytical content.

Ethical Compliance Rating: ● High – Fully aligned with EU and Horizon Europe ethics framework.

Mitigation Actions Required

Area	Identified Risk	Mitigation Measure	Responsible Partner
Data Handling	Temporary risk of re-identification through workshop images or team	Maintain anonymisation logs; ensure DPIA	POLIMI / WP7 Data Manager

	names	summary disclosure	
Consent Archiving	Long-term traceability of consent forms	Store in encrypted repository separate from datasets	POLIMI
AI Use Transparency	Potential ambiguity in AI tool disclosure	Maintain an AI-usage declaration annex in all future deliverables	POLIMI / UNEXT
Open-Access Materials	Risk of inadvertent sharing of derivative content under non-compatible licences	Verify all toolkit elements under CC BY-NC-SA 4.0 before publication	POLIMI / WP6
Continuous Oversight	Need for monitoring of upcoming workshops (Autumn 2025)	Quarterly ethics review by Ethics Committee	UNEXT / WP7

Overall, D1.1 is ethically sound and fully compliant with the principles of privacy, transparency, inclusivity, and accountability. No ethical breaches or high-risk data practices were identified. Residual risk is low and monitored under the project's Ethics Committee oversight.

Ethics Advisor Sign-Off

Name	Organisation	Role	Signature	Date
Fabio Perossini	UNEXT Ltd	OPENVERSE Ethics Advisor		28/10/2025
Venere Ferraro	Politecnico di Milano (POLIMI)	Deliverable Lead		28/10/2025

2. PUBLIC BRIEF DATA PROTECTION IMPACT ASSESSMENT (DPIA)

This public summary describes how the OPENVERSE project, through Deliverable D1.1, ensures that the personal data of participants in co-creation activities are processed lawfully, transparently, and securely, in full compliance with the General Data Protection Regulation (GDPR, EU 2016/679) and the AI Act (Regulation 2024/1689).

Purpose and Context

D1.1 sets out participatory methodologies to engage citizens, researchers, artists, and SMEs in developing open and interoperable virtual-worlds solutions. Data processing occurs solely for the organisation and evaluation of workshops and events, with informed consent as the legal basis.

Lawful Basis for Processing

Processing relies on:

- Article 6(1)(a) GDPR – explicit consent for voluntary participation;
- Article 6(1)(e) GDPR – public interest in scientific research;
- Article 89 GDPR – research safeguards (pseudonymisation, minimal retention, restricted access).

Types of Data Processed

Data Category	Description	Purpose	Retention & Storage
Registration Data	Name, organisation, contact (optional)	Event organisation and feedback	Encrypted EU servers, deleted after project end
Workshop Materials	Notes, drawings, textual contributions	Research and co-creation analysis	Anonymised, archived for reproducibility
Images / Recordings	Photos or short clips (with consent only)	Documentation and dissemination	Stored separately, deleted on withdrawal
Metadata	Participation metrics (non-personal)	Inclusivity evaluation	Retained anonymously for KPIs

Key Safeguards

- Informed Consent: Participants receive a plain-language sheet describing data use and withdrawal rights.
- Data Minimisation: Only strictly necessary data collected.
- Pseudonymisation: All personal identifiers removed before publication.
- Secure Processing: Encryption and access control applied to all repositories.
- Oversight: Continuous review by the Ethics Committee and Data Protection Officer.

Residual Risk and Evaluation

After applying all safeguards, residual privacy risk is rated as low. The DPIA confirms compliance with GDPR and AI Act transparency requirements. The deliverable strengthens trust, inclusivity, and accountability in line with Horizon Europe ethics standards.

Final Evaluation:  Ethically compliant – Low risk, full GDPR alignment, human-centric design confirmed.

A Toolkit for Co-Creation in Virtual Worlds

Designed in 2025 by: Riccardo Ventura, Ilaria Mariani, Venere Ferraro, Francesca Rizzo
Department of Design, Politecnico di Milano



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Research and Innovation SERI



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DIPARTIMENTO DI DESIGN

License and Attribution

This toolkit is designed for open collaboration, and its structure and licensing model are crafted to comply with the terms of all referenced source materials.

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Venere Ferraro, Francesca Rizzo
Department of Design, Politecnico di Milano

Source Material

This work includes content, methodologies, and inspiration drawn from the following sources:

- **Adapted and Derivative Content (CC BY-NC-SA 4.0):** Tools and methodologies were directly adapted, remixed, or inspired by materials from the **AI4Gov Toolkit (CC BY-NC-SA 4.0)** and **Follow the Rabbit: A Field Guide to Systemic Design (CC BY-NC-SA 4.0)**. Due to this adaptation, the ShareAlike condition of these source licenses requires that this resulting toolkit must also adopt the CC BY-NC-SA 4.0 license.
- **Inspirational Use Only (Non-Derivative):** The creation of our new tools, concepts, guides, and the overall structural approach were purely inspired by the materials presented in three other sources. This process involved consulting the **Servicedesigntools (CC BY-NC-ND 2.5)** repository, the **This is Service Design Doing – Method Library (copyrighted content)**, and the **Share, Learn, Innovate! toolkit (copyrighted content)**. The team behind this toolkit consulted these materials for guides, concepts, and structure but did not adopt, adapt, or create derivative versions of their original content.

Cultural Probes

DISCOVER

Cultural Probes are stimuli-based design research tools that invite participants to document personal experiences, contexts, and thoughts through artifacts such as postcards, diaries, or in-world interactive objects. In immersive VW environments, designers distribute digital probes (VR postcards, 3D tokens, prompts) into user spaces.

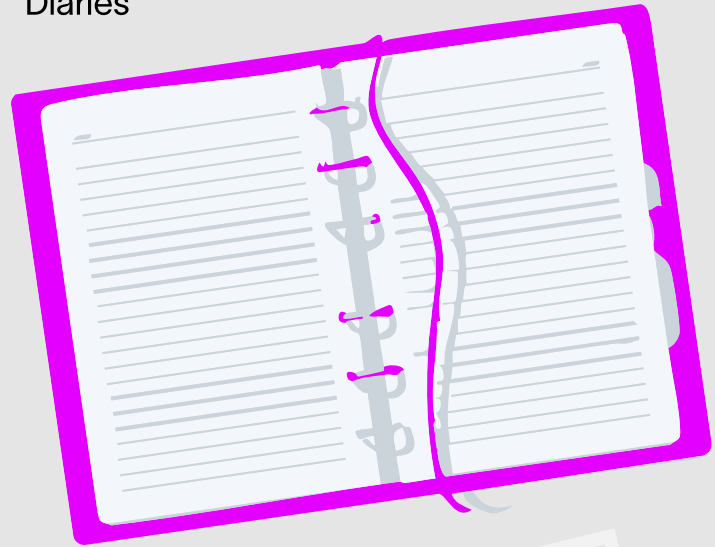
Participants interact, capture audio/video responses, and and interactions in digital environments, and return probes for analysis. Through asynchronous co-creation, teams gather rich qualitative data, uncover emergent needs, and iteratively refine personas, journey maps, and system maps. Ideal for exploratory research in spatial VR or 3D platforms, Cultural Probes foster empathy, spark ideation, and ground service design in lived experiences.

Cultural Probes

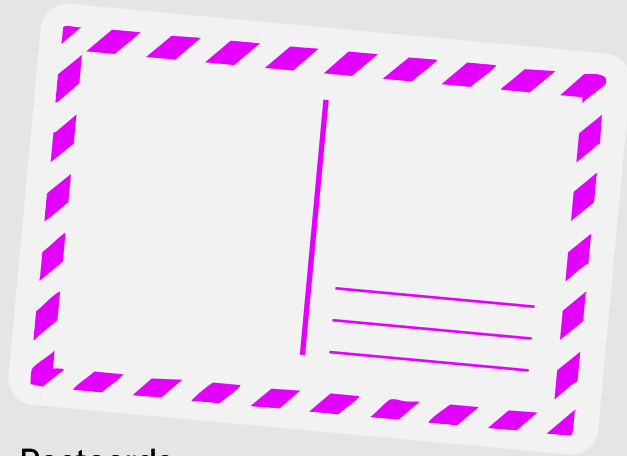
DISCOVER

Which digital / physical objects could help users narrate their virtual worlds experiences?

Diaries



Pictures



Postcards

How to use it?

1. Decide which digital / physical objects could help users narrate their virtual worlds experiences.
2. Ask users to take notes throughout the project.
3. Use notes to gather useful insight for further improvement.

Ecosystem Map

DISCOVER

Ecosystem Map portrays every entity, flow, and relationship that defines a service's surrounding ecosystem in immersive three-dimensional space. Avatars or 3D tokens represent users, partners, suppliers, technologies, and environmental factors, while animated streams trace value exchanges, information channels, and resource movements.

Collaborators navigate the dynamic model, simulate changes—such as adding new nodes or rerouting flows—and observe systemic ripple effects in real time. Participants annotate insights, propose interventions, and iteratively refine connections. Perfect for VR-enabled co-creation workshops, Ecosystem Map fosters holistic understanding, surfaces hidden interdependencies, and aligns stakeholders around end-to-end service innovation strategies.

Ecosystem Map

DISCOVER

Describe all the players involved and place them in the map, central are key players, peripheral are the less important.



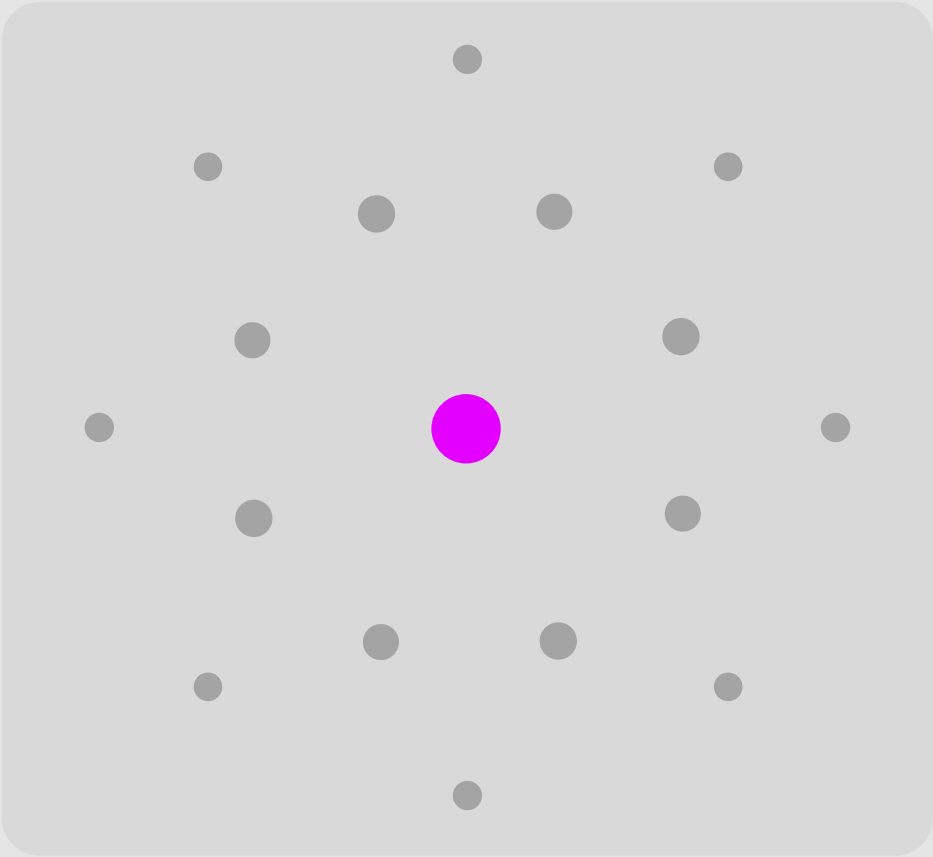












How to use it?

1. Define a central topic and put it at the center of the canvas.
2. Describe relevant players and associate to each a different shape.
3. Place shapes in the map.
4. Central players should be placed close to the center, secondary players peripherically.

Envisioning the Future

DISCOVER

Envisioning the Future is a collaborative scenario-building tool that invites teams to imagine plausible worlds three to six years ahead within virtual environments. Participants embody avatars in detailed VR or 3D spaces, exploring future success states—streamlined operations, empowered customers, sustainable ecosystems.

During guided workshops, they define milestones, identify emerging trends, and co-create narratives that show how organizational goals materialize. By visualizing outcomes and backcasting interventions, Envisioning the Future fosters long-term strategic alignment, surfaces uncertainties, and sparks innovative service breakthroughs. Ideal for remote or hybrid teams, this method leverages immersive storytelling and collective foresight to translate visionary aspirations into actionable roadmaps.

Envisioning the Future

DISCOVER

What/who will you send in the future?

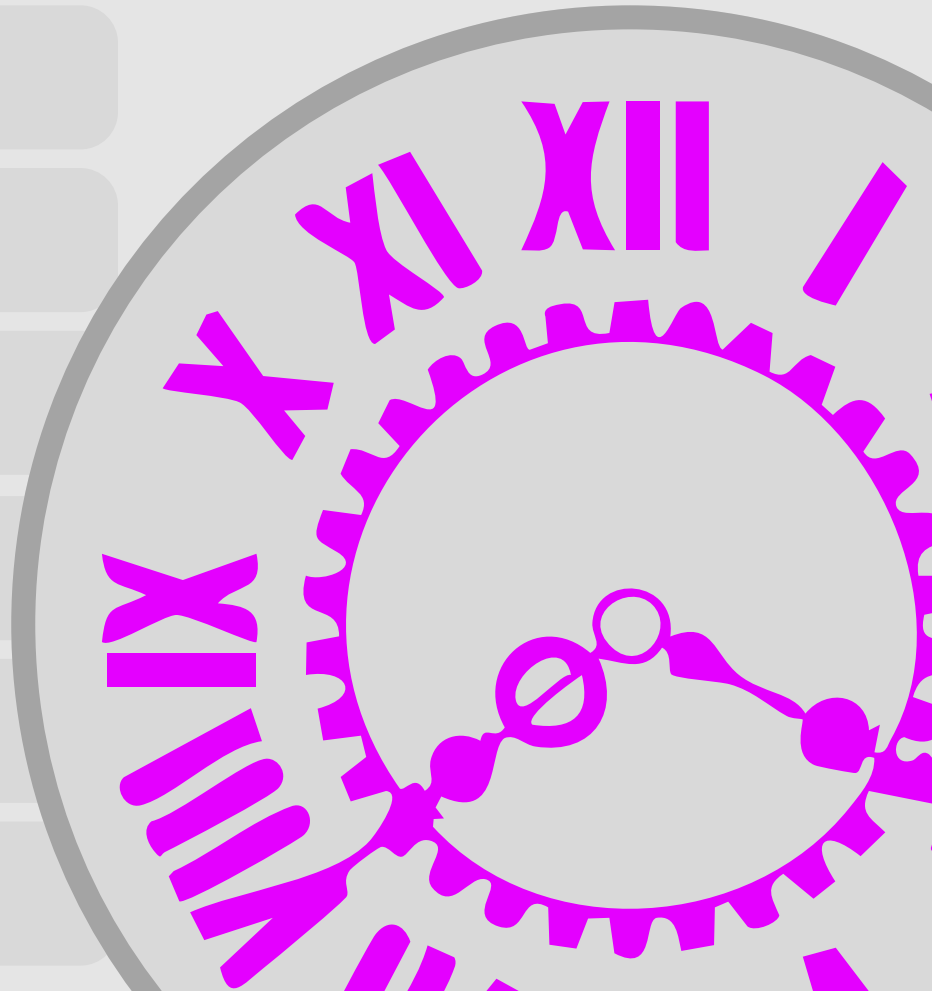
For how long?

What/who came back from the future?

What are the main differences from the past?

Is this new knowledge relevant? Why?

Narrate the scenario with a short story



How to use it?

1. Select a timeframe fro 3 to 6 years.
2. Answer to the provided questions.
3. Describe as a scenario the vision.

Fishbowl

DISCOVER

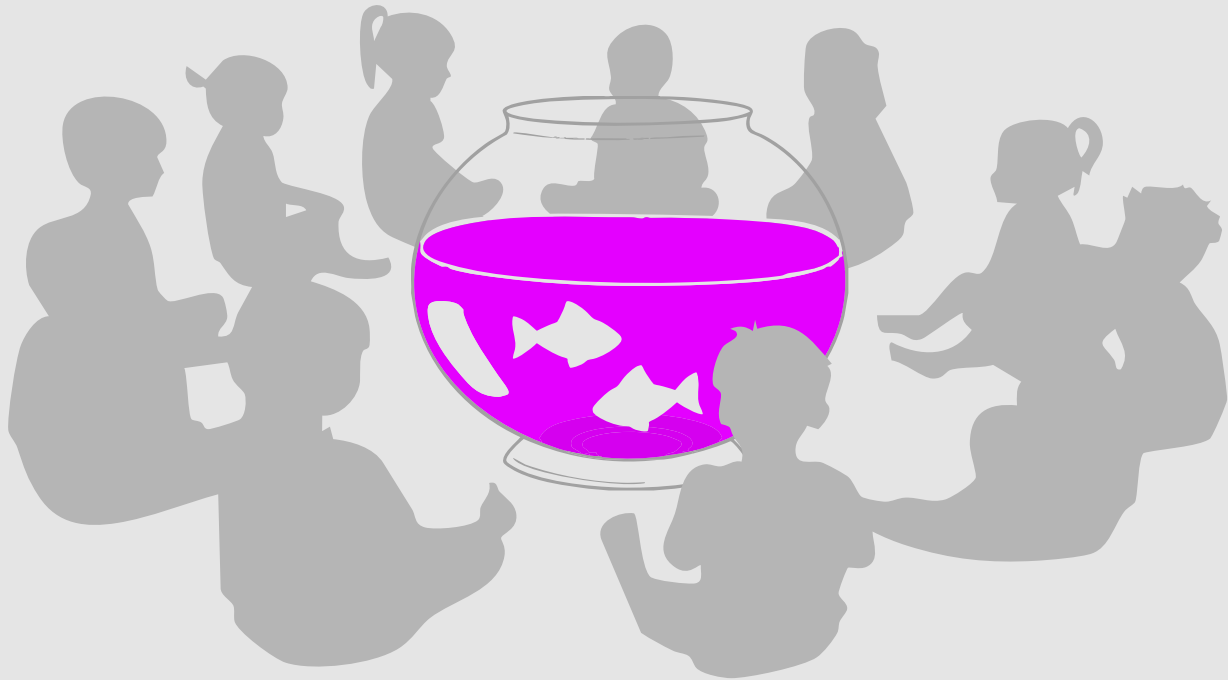
Fishbowl is an interactive dialogue technique that amplifies expert knowledge and broadens group understanding through a concentric-circle setup in virtual worlds.

In a central “bowl,” a handful of skilled avatars discuss targeted questions while an outer ring of observers listens, reflects, and captures insights on spatial whiteboards. When outer participants wish to contribute, they enter the bowl, temporarily swapping places with an inner speaker.

This fluid movement between inner and outer circles democratizes voice, encourages active listening, and fosters shared learning. Deployed in VR or 3D environments, Fishbowl’s structured yet flexible format drives deep engagement, peer teaching, and immersive co-creative exploration.

Fishbowl

DISCOVER



During a “fishbowl” discussion, a group of people actively converse while observers take notes and track key points.

If an observer wishes to join the conversation, they must enter the fishbowl, and in doing so, a current participant switches to being an observer.

How to use it?

1. Gather participants in a physical/virtual environment.
2. Divide participants in 2 groups.
3. Fishes (2-4 people): They have to discuss a relevant topic, at the center of the room.
4. Observers (The rest of the participants): They have to take notes on the discussion and, if they wish to participate, respectfully interrupt the discussion, swapping places with a fish.

Iceberg Diagram

DISCOVER

An Iceberg Diagram visualizes beneath-the-surface forces that shape service behaviors by layering observable events, systemic structures, mental models, and underlying paradigms in a vertical 3D canvas. Participants position avatars or tokens at different strata—the tip of the iceberg representing customer actions, the submerged mass depicting processes, regulations, cultural beliefs, and deeper worldviews.

Collaborators drill down through scenarios in VR environments, annotating feedback loops, mental models, and leverage points that perpetuate current outcomes. Iterative exploration surfaces hidden constraints, reveals impactful intervention zones, and fosters systemic thinking. Ideal for immersive workshops, the Iceberg Diagram enables teams to align on root causes and co-design transformative strategies grounded in deep structural insight.

Iceberg Diagram

DISCOVER

Brainstorm events

What has happened?

Patterns of behaviour

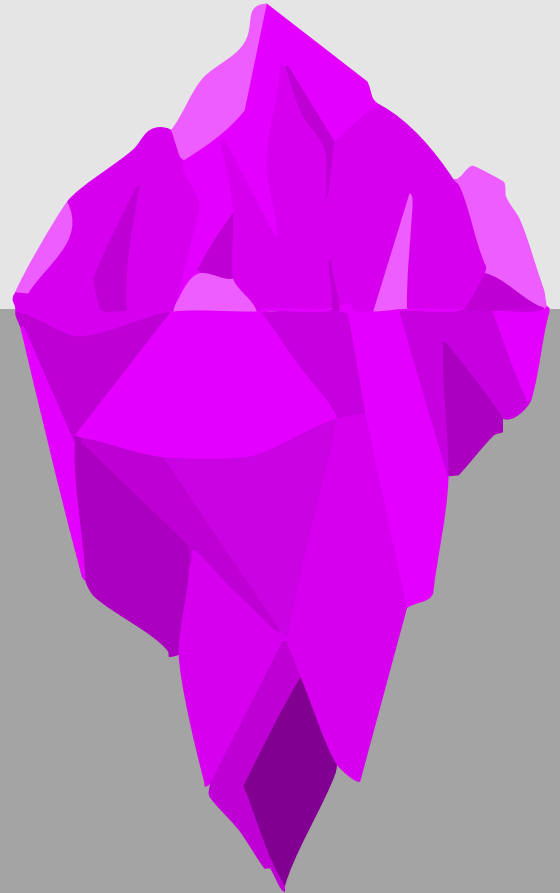
What continues to happen?

Systemic structures

What maintains the pattern?

Mental models

What assumptions and beliefs
created the systemic structures?



How to use it?

1. Define a central topic.
2. Compile brainstorm events section, highlighting relevant aspects.
3. Compile patterns of behaviors section, highlighting repeating aspects.
4. Compile system structures section, highlighting who/what is responsible for pattern creation.
5. Compile mental models section, highlighting which assumptions and beliefs created the systemic structures.
6. After looking at the big picture, place relevant aspects as icons in the iceberg.

Jigsaw

DISCOVER

Jigsaw is a cooperative learning strategy adapted for virtual worlds that divides a complex service challenge into interlocking “puzzle pieces.” Small expert teams explore an assigned component—such as user research, technology integration, or policy constraints—and develop deep insights. Avatars reconvene in a shared 3D space to assemble findings, linking visual tokens, diagrams, and narratives to complete the holistic picture.

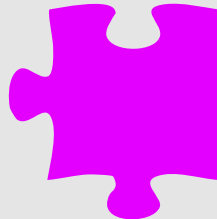
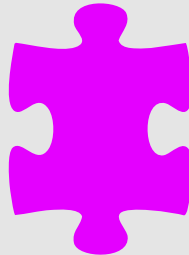
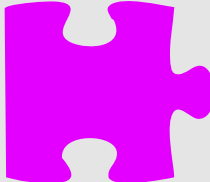
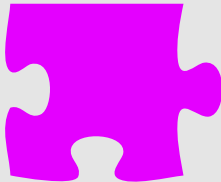
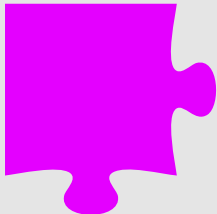
This method leverages spatial distribution, collaborative assembly, and peer teaching to build collective expertise and foster ownership. By transforming individual discoveries into a cohesive ecosystem map, Jigsaw enhances cross-functional understanding, drives mutual accountability, and accelerates integrated service design through immersive, puzzle-based co-creation.

Jigsaw

DISCOVER

The group breaks down in smaller parts and autonomously analyse defined areas of the project (User research, technology possibilities, policy constraints...)

At the end of the activity, the group reassembles all the informations gathered and builds the bigger picture.



Area

Findings

Area

Findings

Area

Findings

Area

Findings

Area

Findings

Area

Findings

How to use it?

1. Divide participants in groups.
2. Assign to each group a relevant topic/ area to discuss
3. Discuss in groups and keep track of the findings.
4. Reassemble the pieces and discuss together the bigger picture.

Knowledge Café

DISCOVER

Knowledge Café or Round Table Sessions is an avatar-led dialogue method that builds collective intelligence in virtual worlds. Participants gather at themed café tables, sharing experiences and posting digital notes on shared canvases. After a timed session, avatars rotate to new tables, carrying forward insights and weaving ideas into a knowledge web.

Each table host curates threads and captures emergent patterns, ensuring continuity. By assuming that every participant is a source of wisdom, the format surfaces novel perspectives and cross-pollinates ideas across the group. Ideal for VR or 3D co-creation spaces, Knowledge Café fosters immersive collaboration and amplifies shared understanding.

Inspired by the toolkit: Follow the Rabbit
Publisher: Colab

Inspired by the toolkit: Share, learn, innovate!
Publisher: United Nations

Toolkit License: CC BY-NC-SA 4.0

Knowledge Café

DISCOVER

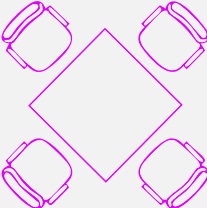
People at tables
switch every ____ minutes

Topic _____

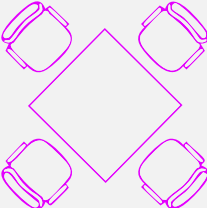
Topic _____

Topic _____

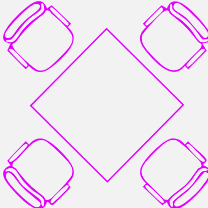
Topic _____



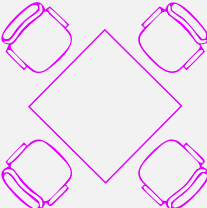
Topic



Topic



Topic



Topic

How to use it?

1. Gather participants in a shared collaborative setting.
2. Define relevant topics of discussion.
3. Define how much time to spend on each discussion before rotating.
4. Divide participants in groups and ask each group to identify a reporter of the insights.
5. Sit on the tables and start the timer, when time is off, rotate and change table/topic.
6. After a full rotation, take some time to share what emerged from each topic between the groups.

Knowledge Fair

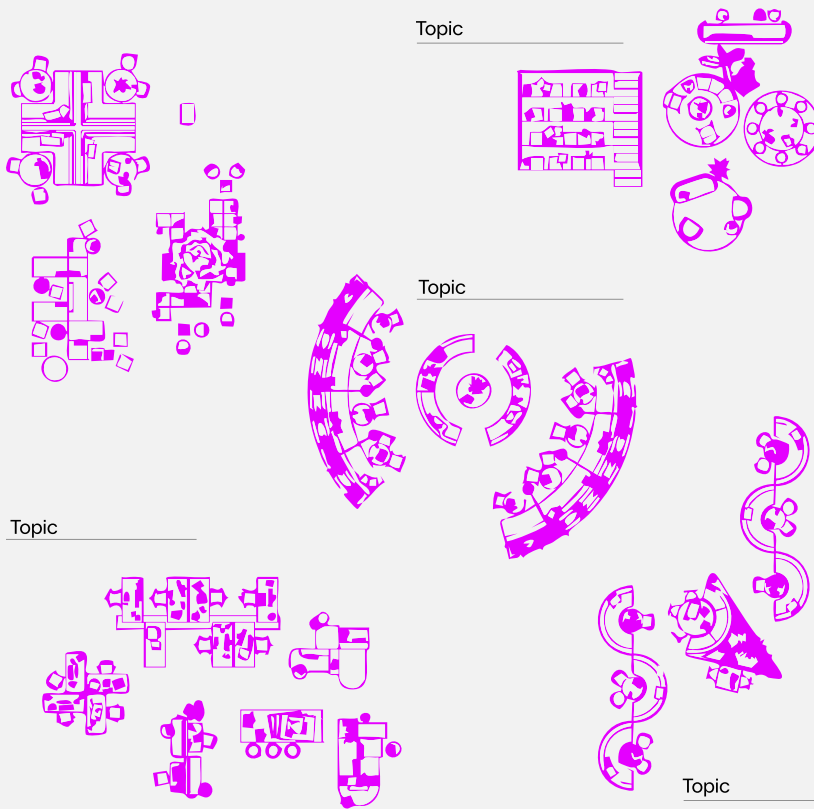
DISCOVER

Knowledge Fair is a virtual event for sharing insights from diverse experts through immersive booths, dynamic displays, and interactive presentations. In a 3D or VR expo hall, participants navigate avatar-driven pavilions themed around specific domains—data privacy, user research, policy design—and engage with multimedia panels showcasing research findings, prototypes, and case studies.

Exhibitors use digital posters, video kiosks, live demos, and spatial annotations to spark dialogue and crowdsourced ideation. Roleplay elements, such as expert avatars hosting Q&A sessions or scenario workshops, deepen engagement. Participants can vote on emerging ideas and form ad-hoc focus groups for deeper exploration. Ideal for large-scale VW co-creation, Knowledge Fair democratizes expertise and accelerates innovative service diffusion.

Knowledge Fair

DISCOVER



Topic _____

Topic _____

Topic _____

Topic _____

Topic _____

Topic _____

How to use it?

1. Gather participants in a shared collaborative setting.
2. Define relevant topics of discussion.
3. Divide participants in groups and ask each group to identify a reporter of the insights.
4. Ask groups to build a personalized virtual/digital space for each topic.
5. Ask reporters to stay in the space and discuss the topic with visitors.
6. Ask other participants to move and discuss the topics freely in the space.
7. When discussions are finished, confront notes of the reporters and gather useful informations

Open Space

DISCOVER

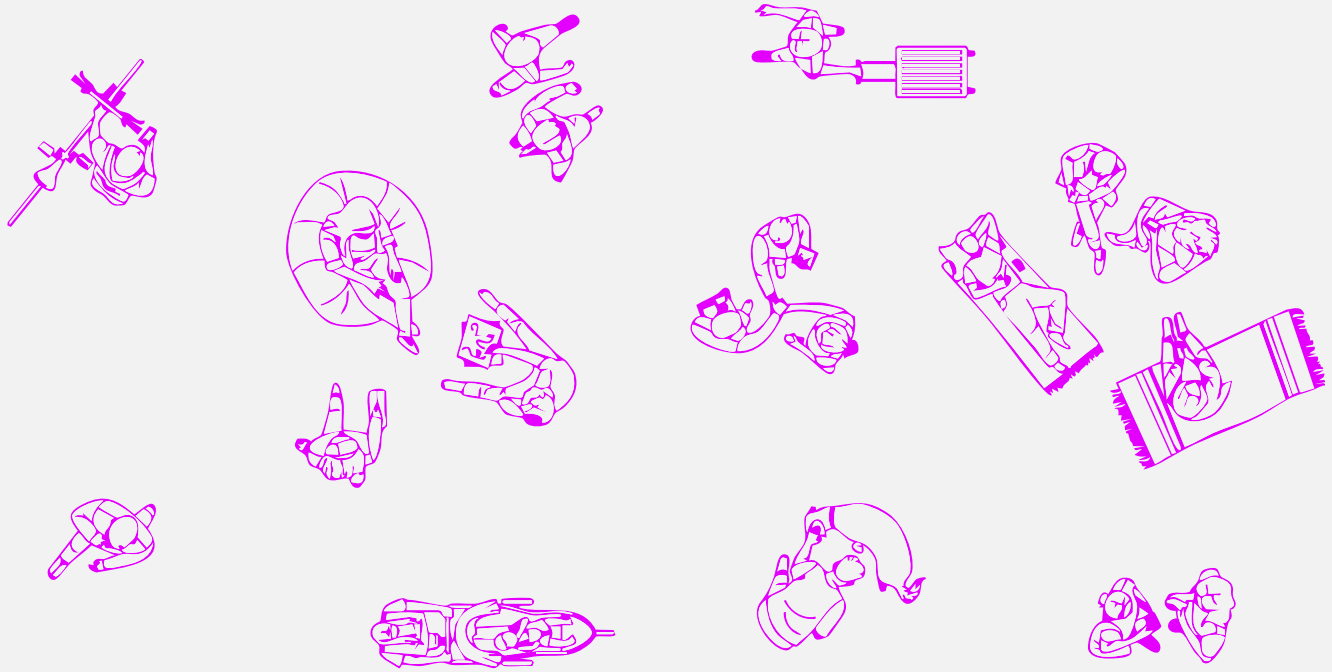
Open Space is a participant-driven agenda creation method that harnesses the self-organizing capacity of virtual-world attendees. In a shared 3D plaza or VR amphitheater, avatars propose topics by posting spatial markers, then gather around interest hubs to co-create content and agendas. Participants dynamically form breakout circles, author session titles, and schedule discussions in real time, shaping learning objectives and collaborative outcomes.

The informal, flexible format empowers autonomy and emergent insights, while facilitators capture key outcomes on virtual whiteboards. Ideal for large-scale VW events, Open Space fosters deep engagement, immersive networked learning, and co-creation by blurring roles between organizers and participants.

Open Space

DISCOVER

Create an unstructured, open virtual space where participants can autonomously organize and discuss



How to use it?

1. Gather participants in a shared collaborative setting.
2. Define relevant topics of discussion.
3. Allow participants to discuss in a free and unstructured space the topics.
4. Ask groups to build a project agenda on the next steps
5. When discussions are finished, gather useful informations

Problem Framing

DISCOVER

Problem Framing is a visual synthesis method that defines and structures ambiguous or complex challenges. Teams collaborate in a 3D canvas to externalize problem elements—constraints, assumptions, stakeholders, and unknowns—as digital nodes or clusters. Participants drag and group digital sticky notes, icons, and shapes to represent pain points, policy constraints, technical uncertainties, and user needs.

Over iterative sessions, they refine connections, annotate dependencies, and expose gaps in understanding. By framing a structured problem frame, teams reduce ambiguity, align on research focus, and establish a clear foundation for design. Ideal for early-stage co-creation workshops, Problem Framing guides planning and stakeholder consensus.

Problem Framing

DISCOVER

Area

In which area there is room for this project?

Audience

Who is the project for?

Virtual World

In what kind of virtual worlds is your innovation located?

Expected impact

What are the main goals of your project

How to use it?

- Identify the specific problem you want to answer with the project.
- Identify one or two types of audience affected by the project
- Identify the long-term impact of the problem, and its general goals
- Identify the physical or abstract space in which the problem manifests and which kind of affordances and interactions does it allow

Service Safari

DISCOVER

Service Safari immerses designers in first-person explorations of a service using avatar-led autoethnography within virtual worlds. Participants navigate key touchpoints—booking, service delivery, support—experiencing each interaction exactly as a customer would. As they move through the environment, they capture contextual insights via spatial annotations, voice memos, and reflective prompts triggered at meaningful moments.

This method uncovers hidden pain points, emotional reactions, and design opportunities with authentic “lived” perspective. Ideal for VR headsets or 3D platforms, Service Safari combines deep empathy and active roleplay to generate rich qualitative data, inspire creative solutions, and guide user-centered service innovation.

Strong Suits

Text	Text
Text	Text

Pain Points

Text	Text
Text	Text

Miscellaneous

Text	Text
Text	Text

Onboarding

Interaction

End of Exp.

How to use it?

- Identify strong suits of the project.
- Identify pain points of the project
- Identify miscellaneous aspects of the project
- Place in the different temporal columns the identified aspects.

Social Network Analysis

DISCOVER

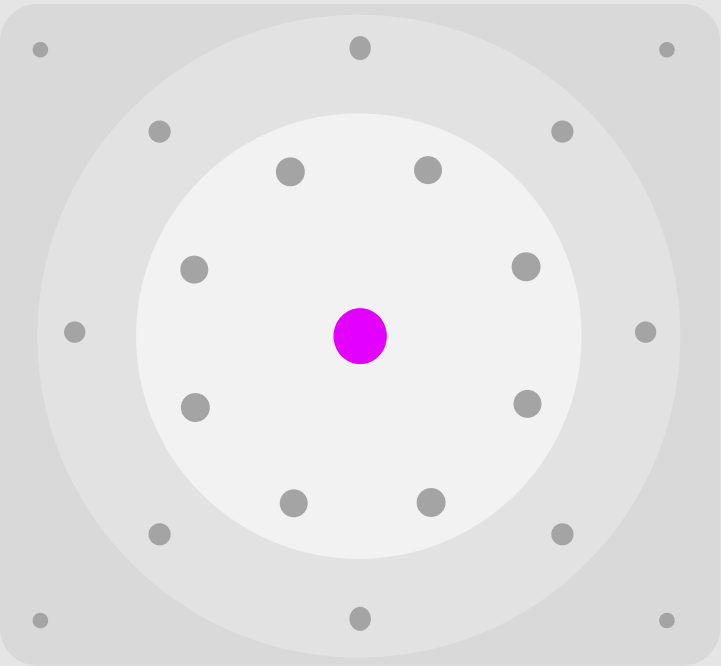
Social Network Analysis visualizes the web of relationships and knowledge flows among individuals, teams, and organizations within a service ecosystem. In a virtual world, nodes—avatars representing people or groups—are positioned in 3D space, with linkages animating communication channels, collaboration ties, and information exchanges.

Participants can navigate the network, inspect connection strengths, and simulate changes (e.g., adding new roles or breaking silos) to observe systemic impacts. This method uncovers hidden influencers, bottlenecks, and expertise hubs, guiding targeted interventions. Ideal for VR or immersive 3D platforms, Social Network Analysis enhances stakeholder alignment by making invisible social structures visible and tunable for optimized service co-creation.

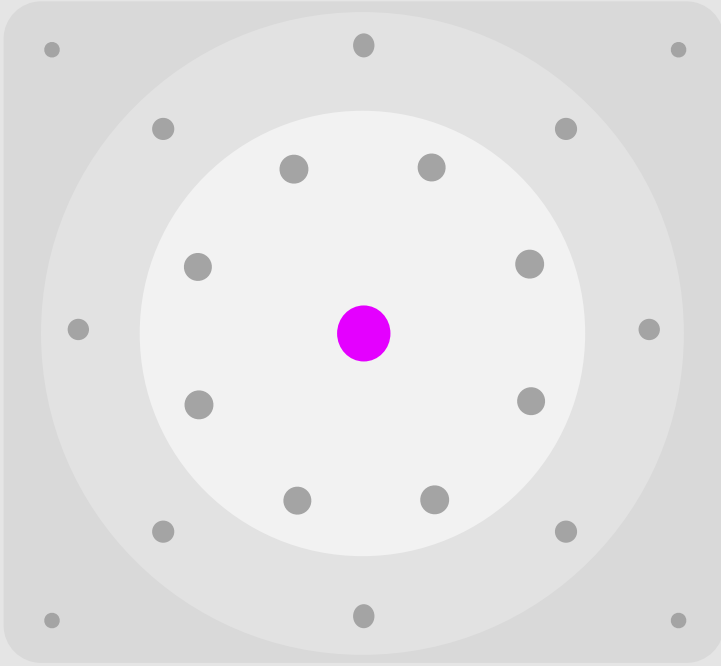
Social Network Analysis

DISCOVER

Place a stakeholder in the center and add other individuals/groups in the nodes.
Create connection between the nodes.



Stakeholder in analysis: _____
Stakeholders in the social network: _____



Stakeholder in analysis: _____
Stakeholders in the social network: _____

How to use it?

- Identify a meaningful stakeholder to analyze.
- Identify other relevant stakeholders to include in the social network.
- Place in the map the different stakeholders and visualize the ecosystem.

Sociometrics

DISCOVER

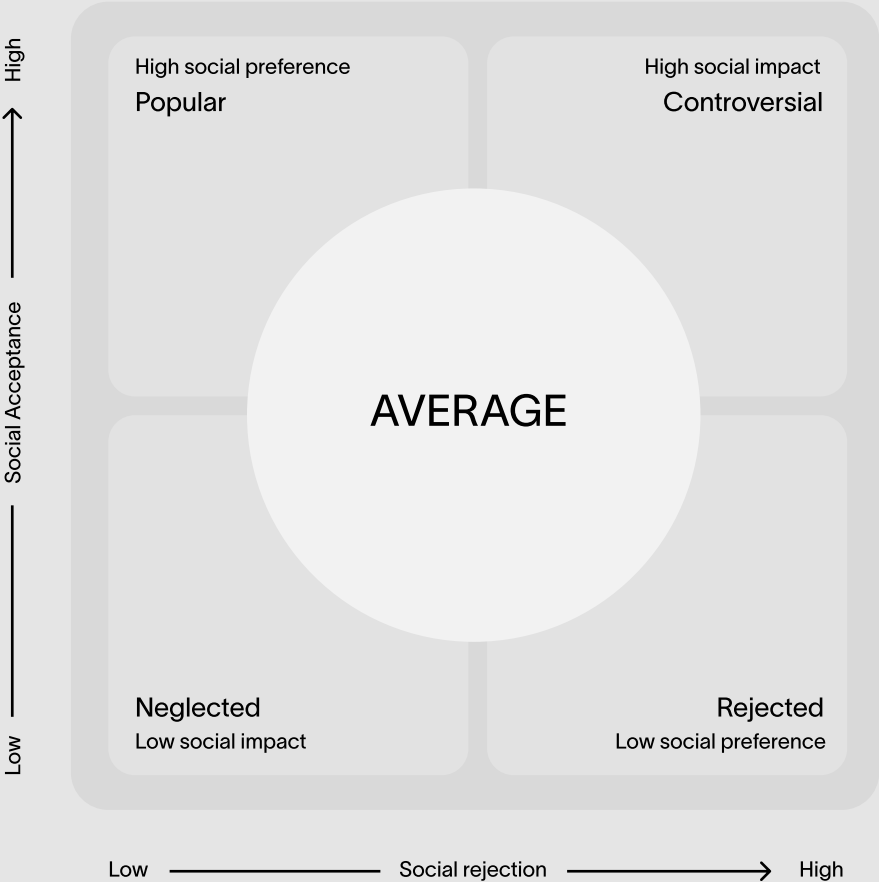
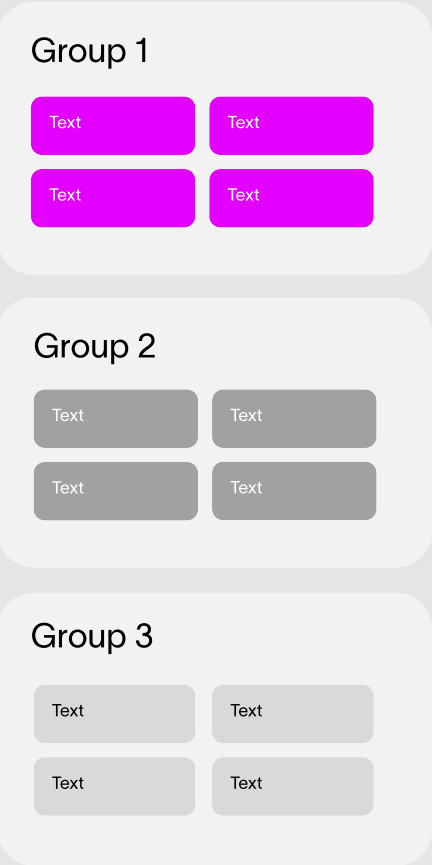
Sociometrics uses embodied spatial modelling in virtual worlds to map social dynamics, influence patterns, and group interactions. Participants assume avatar roles and position themselves within 3D spaces to represent relationships—cooperation, authority, trust—connecting with lines or proximity triggers that reveal network density and communication pathways.

By externalizing interpersonal ties and emergent power structures, Sociometrics surfaces hidden influencers, friction points, and collaboration opportunities. Ideal for VR or desktop-based immersive platforms, this method enhances team alignment, deepens social insight, and supports targeted interventions in service ecosystem co-creation.

Košir, K., & Pečjak, S. (2005). Sociometry as a method for investigating peer relationships: What does it actually measure? *Educational Research*, 47(1), 127–144. <https://doi.org/10.1080/0013188042000337604>

Sociometrics

DISCOVER



How to use it?

- Identify relevant social dynamics, influence patterns, and social interactions as well as relevant stakeholders.
- Create clusters (Group 1, Group 2...).
- Map the notes in the canvas, ranging from low to high social rejection and from low to high social acceptance.

Stakeholder Map

DISCOVER

Stakeholder Map visually arranges all actors in a service ecosystem by plotting individuals, groups, and organizations on axes of influence and interest within a shared virtual canvas. Designers place avatar tokens or 3D icons to represent each stakeholder, then draw animated links to illustrate relationships, dependencies, and communication channels.

Participants can filter by attributes, inspect persona profiles, and simulate scenario overlays to see how policy changes or market shifts affect power dynamics. Suitable for VR workshops or desktop co-creation sessions, Stakeholder Map clarifies project scope, aligns cross-functional teams, and surfaces key partners or friction points for targeted engagement.

Stakeholder Map

DISCOVER

Group 1

Text

Text

Text

Text

Group 2

Text

Text

Text

Text

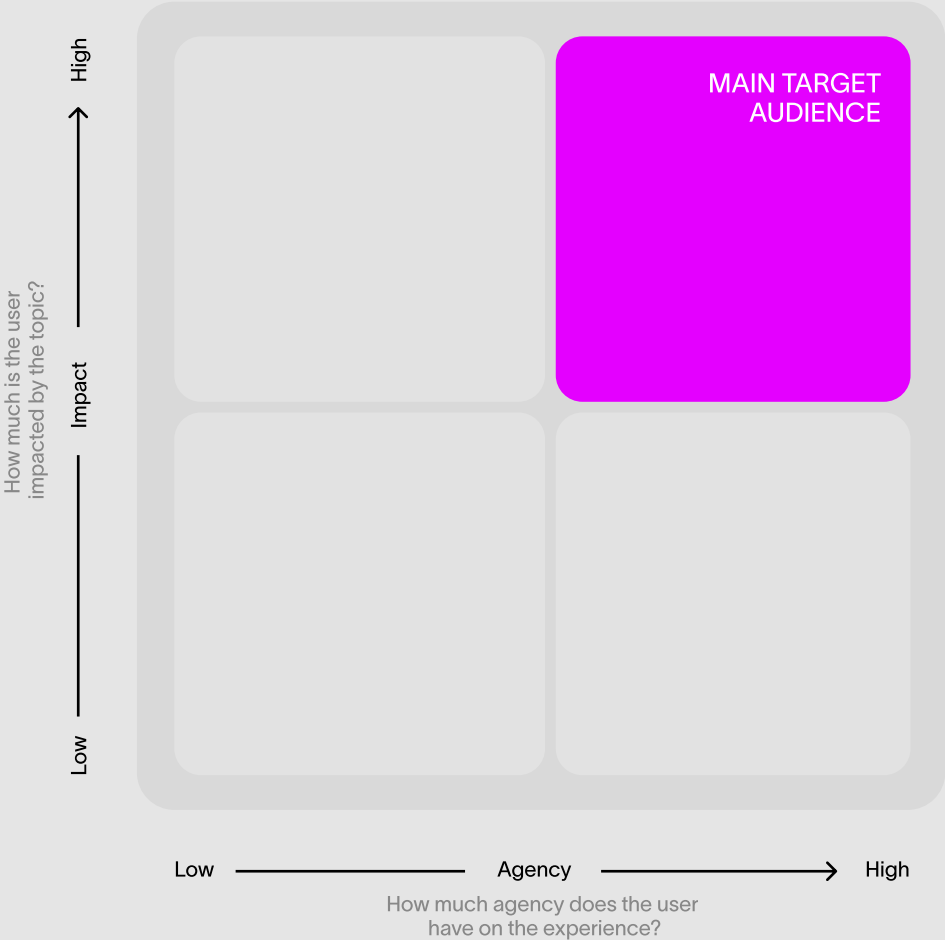
Group 3

Text

Text

Text

Text



How to use it?

- Identify all relevant stakeholders.
- Create categories and cluster the stakeholders.
- Map stakeholders in the canvas, ranging from low to high agency and from low to high impact.

Stakeholder Value Map

DISCOVER

A Stakeholder Value Map distills the core motivations and needs of each stakeholder within a service ecosystem by plotting practical, social, and higher personal values on a shared virtual canvas. Participants assume avatar roles representing users, partners, regulators, or employees and annotate a 3D map with value attributes—basic necessities, relational priorities, and dignity-driven aspirations.

Through interactive dialogues, avatars voice their value-driven perspectives at key journey phases, while collaborators cluster and compare value patterns to uncover emerging tensions or alignments. Ideal for VR or 3D workshops, this immersive method enhances empathy, grounds decision-making in stakeholder priorities, and supports narrative-driven co-creation to optimize value exchange.

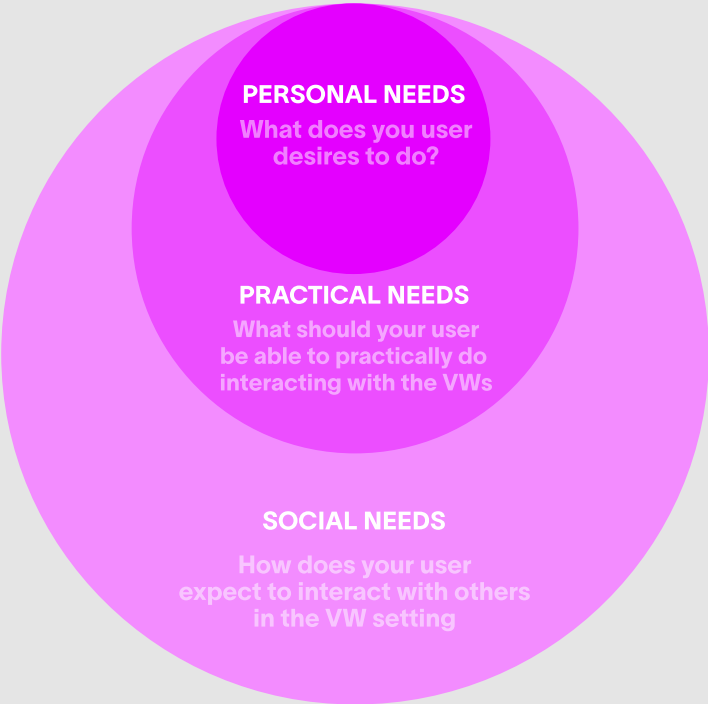
Stakeholder Value Map

DISCOVER

Stakeholder



Stakeholder



How to use it?

- Identify meaningful stakeholders to analyze.
- For the cluster of Personal Needs, add note(s) describing what your user desires to do.
- For the cluster of Practical Needs, add note(s) describing what your user should be able to practically do while interacting with the virtual world.
- For the cluster of Social Needs, add note(s) describing how does your user expect to interact with others in the virtual world.

Ecosystem Loops

DISCOVER

DEFINE

Ecosystem Loops is an immersive mapping tool that visualizes complex service ecosystems across multiple scales—users, stakeholders, partner networks, objects, and environments—within virtual worlds. Participants arrange and connect 3D tokens or avatars to represent entities and draw animated flows that trace value exchanges, information transfers, and dependencies.

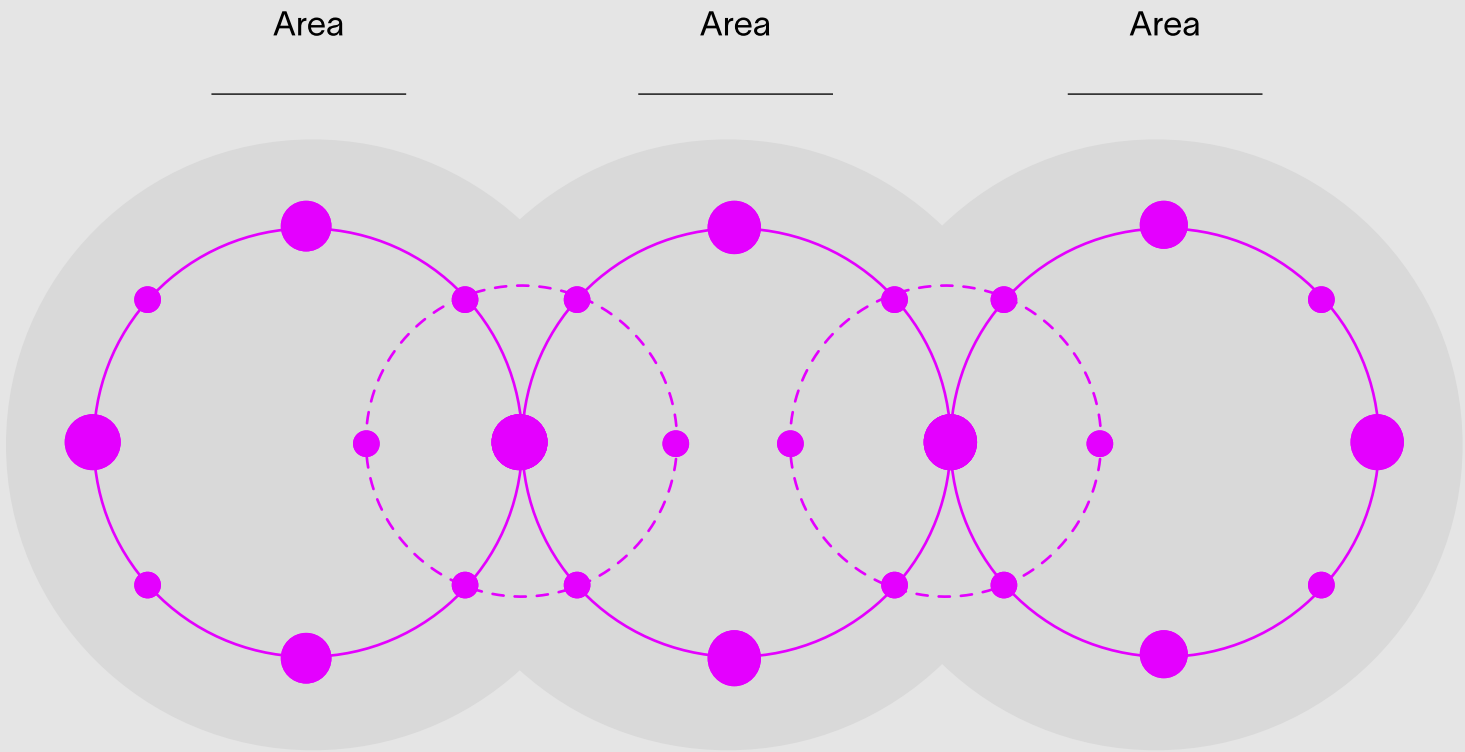
By toggling between micro-interactions and macro-system overviews, teams uncover feedback loops, bottlenecks, and leverage points in real time. Ideal for VR or spatial 3D platforms, Ecosystem Loops fosters high collaboration as stakeholders co-create and manipulate the living system model together. This method drives holistic insight, aligns diverse perspectives, and informs resilient, scalable service design strategies.

Ecosystem Loops

DISCOVER

DEFINE

Define areas, stakeholder and their connections



How to use it?

- Identify the main areas of interest and related topics as sub-areas, if needed.
- Identify relevant stakeholders and potential users and place them in the map.
- Define connections of different types between them to create an ecosystem.

Co-creating Journey Maps

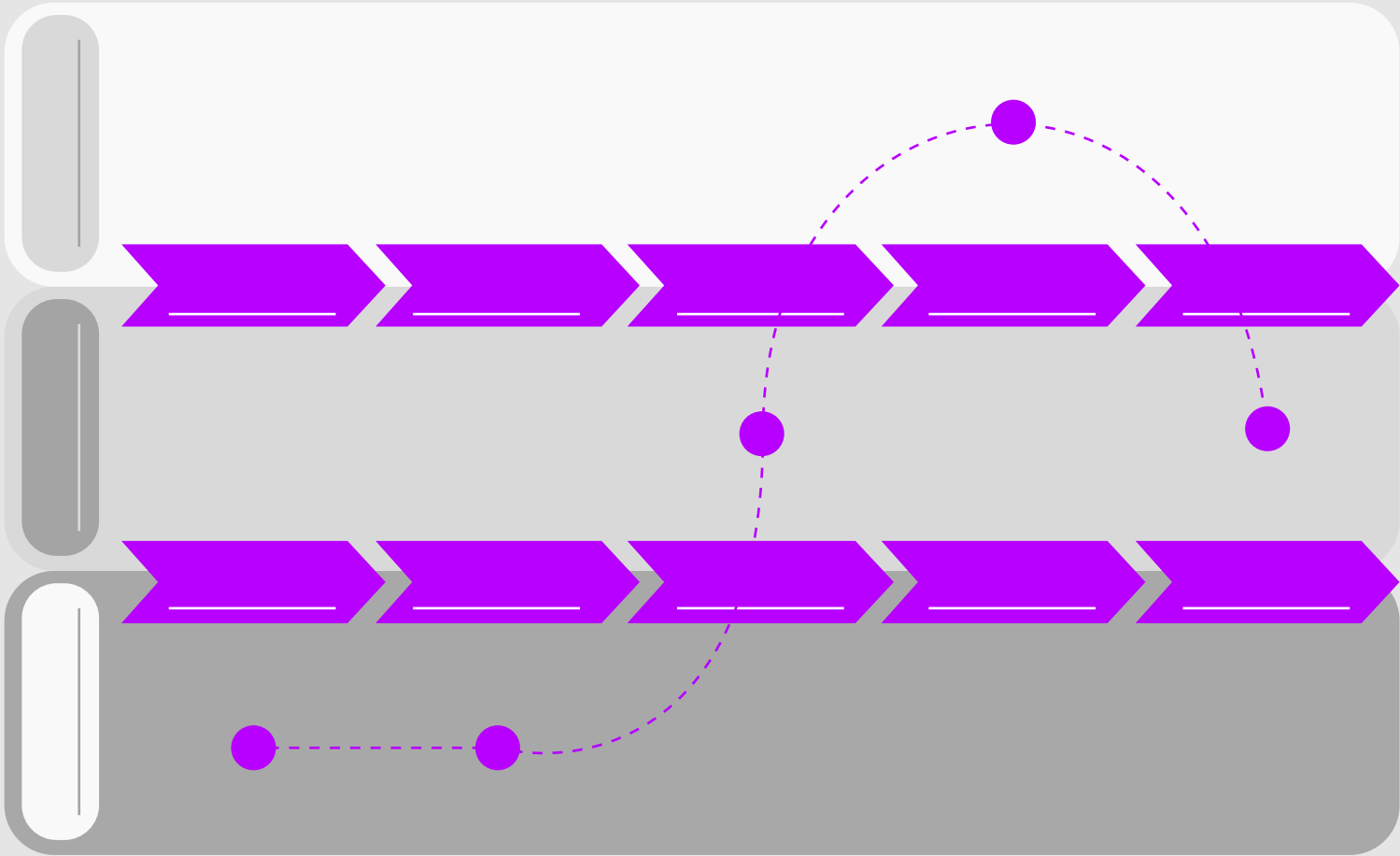
DEFINE

Co-creating Journey Maps harnesses the collective expertise of invited participants to collaboratively construct detailed customer journeys within immersive virtual environments. Participants embody avatars representing diverse user roles and pool first-hand insights, documenting touchpoints, pain points, emotional states, and backstage processes along a shared 3D timeline. As contributors add and cluster digital sticky notes, icons, and sketches, the group iterates on journey phases, pauses to explore branching scenarios, and surfaces opportunities for innovation.

Live annotation, voting, and role-swapping ensure diverse perspectives shape the narrative. Ideal for VR or spatial collaboration platforms, Co-creating Journey Maps fosters deep empathy, aligns stakeholder understanding, and accelerates co-design of optimized end-to-end service experiences.

Co-creating Journey Maps

DEFINE



How to use it?

1. Break down the user Journey of the project in steps and list them in the purple slots.
2. Define dimensions such as Physical/digital Touchpoints, Negative/Positive Experience etc... and list them in the slots on the left
3. Place relevant User activities across the canvas, mapping the journey of the user with a connection line.

Co-creating Personas

DEFINE

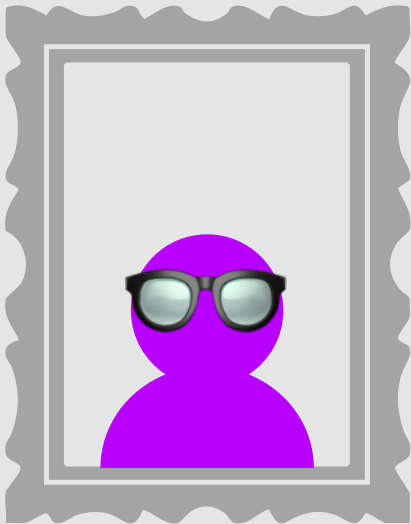
Co-creating Personas is a collaborative method that leverages the collective expertise of invited participants to develop rich, context-driven user archetypes and associated journey maps or service blueprints in virtual worlds. Workshop attendees assume avatar roles representing target segments and co-design persona profiles by contributing real-world insights, behaviors, motivations, and pain points.

As personas crystallize, teams animate them through scenario enactments, roleplay, and narrative sessions to validate assumptions and uncover hidden needs. This immersive approach fosters shared ownership, aligns diverse stakeholders, and embeds empathy throughout the design process. Flexible for VR or 3D desktop platforms, Co-creating Personas drives depth, nuance, and stakeholder buy-in.

Co-creating Personas

DEFINE

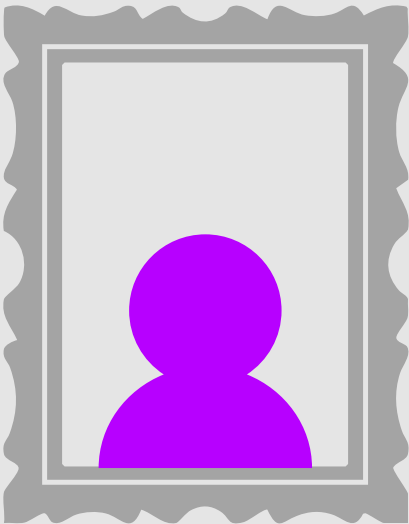
Add emojis to design personas, name their archetype and define motivations and pain points



Archetype: _____

Motivations: _____

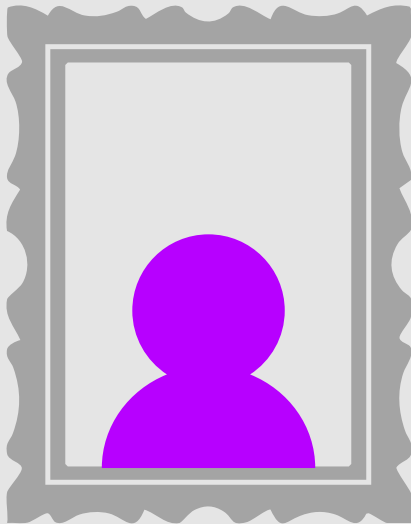
Pain Points: _____



Archetype: _____

Motivations: _____

Pain Points: _____



Archetype: _____

Motivations: _____

Pain Points: _____

How to use it?

1. Identify relevant stakeholders to analyze and meaningful personas.
2. Define an archetype for your persona.
3. Describe the motivations that move the user.
4. Describe the pain points the persona could encounter.
5. Decorate with emojis/images the picture of the persona to better define its profile.

Co-Creative Workshops

DEFINE

Co-creative Workshops leverage the expertise of invited stakeholders to jointly develop rich personas and service artifacts within virtual worlds. Participants adopt avatar identities aligned with target segments and contribute real-world observations, motivations, behaviors, and pain points through interactive exercises.

As the group clusters and refines characteristics, they animate personas in scenario enactments to validate assumptions and reveal hidden needs. Facilitators guide collaborative storytelling, encourage role-swapping, and capture emergent themes on 3D canvases. Ideal for VR or desktop 3D platforms, Co-creative Workshops foster shared ownership, deepen empathy, build consensus, and deliver nuanced personas that inform subsequent journey mapping, prototyping, and co-design activities.

Co-Creative Workshops

DEFINE

Define roles

Participant: _____
Role: _____

Participant: _____
Role: _____

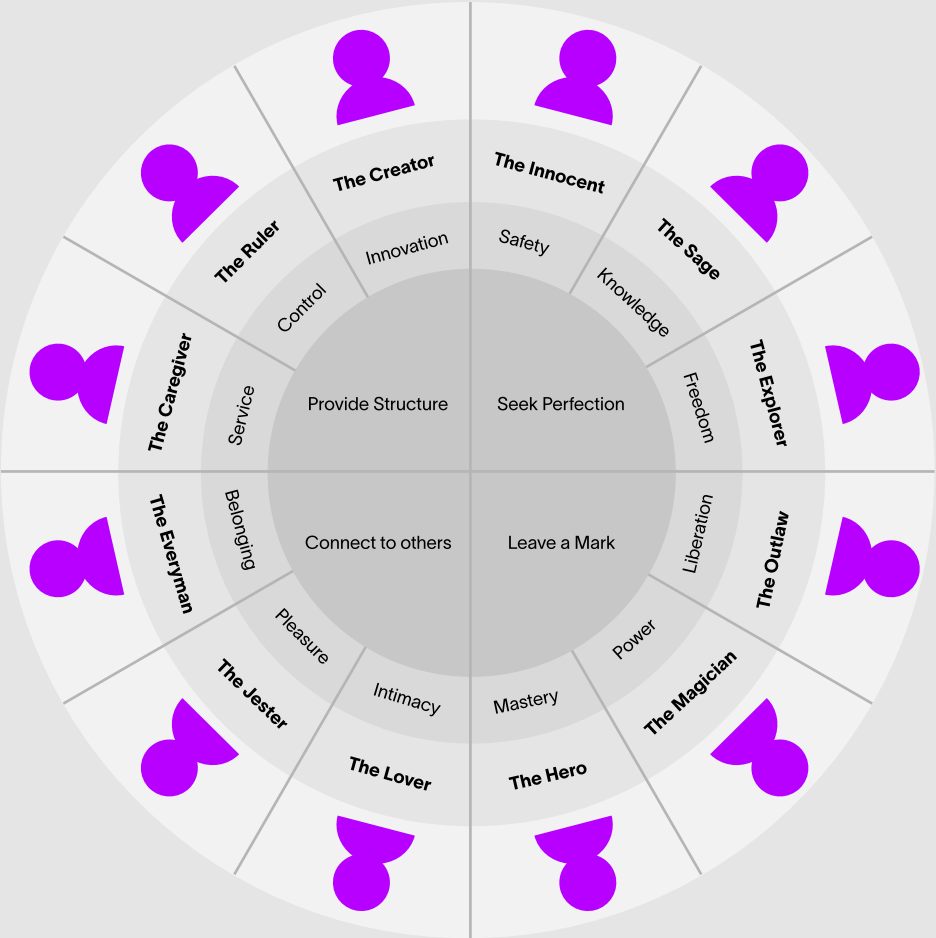
Participant: _____
Role: _____

Participant: _____
Role: _____

Participant: _____
Role: _____

Participant: _____
Role: _____

Participant: _____
Role: _____



How to use it?

1. Select a topic of discussion
2. Assign to each participant a role from the archetype wheel and list it in the boxes.
3. Identify a reporter of the discussion.
4. Start the discussion and make sure every participant is interpreting the point of view of their archetype.

Emotional Journey Map

DEFINE

Emotional Journey maps shifts in user perception and emotional valence across a service experience in a virtual world. Designers plot rising and falling emotional states along a spatial timeline using 3D curves or color-coded overlays. During scenario enactments, avatars display real-time emotional cues—gestures, facial animations, environmental feedback—which observers annotate to pinpoint stress peaks, delight moments, or ambivalence.

Through iterative replay, teams co-design interventions to smooth pain points and amplify positive highlights. Ideal for VR or immersive 3D platforms, Emotional Journey fosters deep empathy by externalizing subjective experience, aligning stakeholders around shared emotional insights, and driving targeted, affective service improvements.

Emotional Journey Map

DEFINE

User Journey



Emotions

😊
😊
🙂
😐
😓
😞
😭

Opportunities

How to use it?

1. Break down the user Journey of the project in steps and represent them in the slots.
2. Following the User Journey above, represent with a line the emotions the user feels while going through its journey.
3. For every significant emotional step, note down which opportunities emerge.

Impact Journey

DEFINE

Impact Journey is a foresight tool that models and evaluates effects of a service experience across environmental, social, and economic dimensions in an interactive virtual world. Participants enact key touchpoints as avatars—customers, service personnel, suppliers—while indicators trace resource consumption, waste streams, community benefits, and carbon footprints along the timeline.

Observers pause and propose sustainable alternatives—material substitutions, process optimizations, circular loops—and visualize their impact using dynamic overlays. By embedding sustainability metrics into storytelling and roleplay, Impact Journey fosters empathy, uncovers unintended consequences, and generates actionable creative ideas for sustainable, resilient service ecosystems. Ideal for VR workshops on sustainable innovation.

Impact Journey - Indicators

DEFINE

Areas

Metrics

System Phases

01

02

03

Sustainable alternatives

How to use it?

1. Break down the System Phases of the project in steps and list them in the slots on the left.
2. Define meaningful areas of impact for the project such as environment, society, economy etc... and list them.
3. For every area, define metrics of evaluation such as resource consumption, waste streams, community benefits, carbon footprints etc... and list them.
4. Crossing the system phases of your project and the areas of impact, define (when necessary) relevant sustainable alternatives for the current solutions.

Mapping Journeys

DEFINE

Mapping Journeys visualizes the service ecosystem around physical and digital products by creating spatial, interactive maps in VR or 3D platforms. Participants drag and connect avatars, 3D tokens, or digital artifacts to represent users, touchpoints, channels, and product interactions across layered environments. As teams assemble and reposition elements, they surface dependencies, information flows, and ecosystem boundaries, running “what-if” experiments by introducing new nodes or rerouting connections.

Observers and co-creators annotate live, revealing optimization opportunities and integration points. While it offers limited narrative depth on its own, Mapping Journeys excels at immersive spatial analytics, fostering collaborative sense-making and aligning cross-functional teams around holistic service landscapes.

Mapping Journeys

DEFINE

Journeys

01

02

03

04

Actors





Actions







Connections







How to use it?

1. Identify relevant actors to analyze (Users, Industries...).
2. Identify relevant actions to analyze (Purchase, Log-in...).
3. Identify relevant connections to analyze (Personal relationship, wi-fi connection...).
4. Create as many user journeys as necessary for comparison and gather relevant insights from it.

System Map

DEFINE

System Map is an immersive spatial tool for visualizing all actors and components involved in service delivery within virtual worlds. Designers create a shared 3D canvas where avatars or tokens represent users, frontline staff, support systems, digital platforms, and environmental elements.

Participants drag, position, and link these modules to trace information flows, handoffs, and boundaries between subsystems. Observers could filter layers, highlight dependencies, and annotate friction points in real time.

While direct roleplay is minimal, teams can embed scenarios by triggering animations or path simulations. Ideal for VR or desktop-based 3D workshops, System Map fosters clarity of complex architectures, aligns cross-functional understanding, and informs optimization strategies.

System Map

DEFINE

Actors





Touchpoints







Connections







Map

How to use it?

1. Identify relevant actors to analyze (Users, Industries...).
2. Identify relevant touchpoints to analyze (Social media engagement, in-person interactions...).
3. Identify relevant connections to analyze (Personal relationship, wi-fi connection...).
4. Add all the element in the map and profile a comprehensive system.

System Scenario

DEFINE

System Scenario is a dynamic simulation tool that models how a service ecosystem adapts and evolves under specific conditions. In a virtual 3D or VR environment, participants configure scenario parameters—seasonal demand spikes, regulatory shifts, tech failures—and watch animated system components (avatars, processes, data flows) respond in real time.

Observers can pause, tweak variables, and branch into alternative futures to test resilience and spot emergent behaviors.

Ideal for avatar-driven storytelling and scenario planning in immersive platforms, System Scenarios deepen understanding of systemic dynamics, foster collaborative “what-if” exploration, and surface strategic interventions before real-world rollout.

System Scenario

DEFINE

Identify Key Scenarios

Title: _____

What if ... _____

Prioritize actors

1



2



3



4



5



6



Map connections between actors

Pain Points

Opportunities

How to use it?

1. Define a scenario and express it with a What-if formula
2. Give a title to the scenario.
3. Define and prioritize relevant actors.
4. Place them in the map and define their connections.
5. Identify emerging pain points and opportunities.

Transition Journey

DEFINE

Transition Journey is a dynamic tool that maps and analyzes how user behavior and roles evolve over time within a service ecosystem. In virtual worlds, participants embody avatars that transition through sequential personas—novice to expert, customer to advocate—navigating branching scenarios that illustrate changing motivations, skills, and expectations.

Teams simulate multiple horizons and tweak transition triggers (feature rollouts, policy shifts, social influences) in real time, uncovering new experience archetypes and potential friction points. Observers pause, annotate, and co-design adaptive interventions on the fly.

Ideal for immersive VR workshops, Transition Journey combines narrative forecasting with spatial roleplay to drive strategic foresight and align stakeholders around future-ready service roadmaps.

Transition Journey

DEFINE

Define User

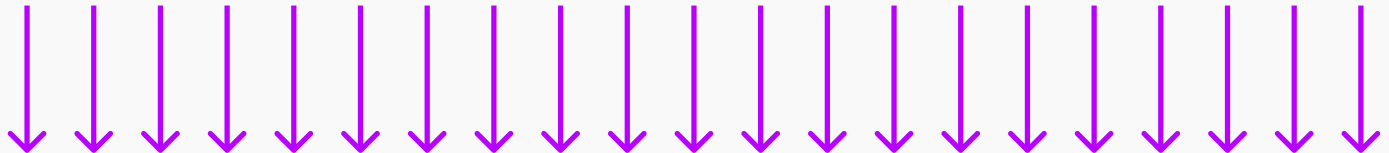
Define Possible User Journeys



Motivations:

Pain Points:

Define Possible Transition Points Between User Journeys



How to use it?

1. Define the target user.
2. Identify their motivations and pain points.
3. Define multiple possible user journeys.
4. Use transition arrows to explore where the journeys could transit, in order to discover pain points and opportunities.

AI Functionalities Cards

DEVELOP

AI Functionalities Cards are a spatial ideation tool designed to spark innovation by showcasing modular AI capabilities—natural language processing, computer vision, recommendation engines, anomaly detection, and more—as tangible cards in virtual environments. Participants navigate VR or 3D workspaces where avatars draw from a digital deck of functionality cards, combining and placing them along service journeys or ecosystem maps.

Through iterative play, teams discover novel applications, align technical possibilities with user needs, and generate creative service enhancements. Ideal for immersive brainstorming sessions, AI Functionalities Cards democratize AI knowledge, foster cross-disciplinary collaboration, and accelerate the translation of emerging technologies into practical, user-centered service concepts.

AI Functionalities Cards

DEVELOP



Machine Learning and Analytics



Pattern Recognition



Anomaly Detection



Efficiency Analytics



Resource Optimization



Predictive Modeling



Natural Language Processing



Multimodal User Interfaces



Computer Vision



Audio Processing



Extended Reality (VR/ AR)



Advanced Sensory Inputs (air, smell, etc)



Adaptive Interfaces



Zero Interactions Services



Bots, agents, assistants



Process automation



Augmented Decision Making



Adaptive Learning Systems



IoT integrations



User Behavior Analysis



Context Awareness



Emotion and Sentiment Analysis



Personalised Content Curation



Generative AI

How to use it?

1. After defining your project, identify which category of AI could be implemented among the four.
2. Use the AI functionalities cards to gain knowledge and inspiration for AI integration.

Concept Walkthrough

DEVELOP

Concept Walkthrough is a guided, immersive, step-by-step 3D or VR tour that presents a service concept through sequential stages, enabling stakeholders to experience proposed features and flows in context. Creators animate avatars or interactive hotspots to demonstrate each touchpoint—from discovery to service completion—while participants observe, comment, and suggest ongoing improvements in real time.

By visualizing the envisioned journey step by step, teams gain early user feedback, validate assumptions, and align on requirements before heavy investment. Ideal for VR-enabled workshops or desktop co-creation sessions, Concept Walkthroughs offer moderate immersion, clarity of vision, and structured, seamless collaboration to refine service concepts collaboratively.

Concept Walkthrough

DEVELOP



How to use it?

1. Define the user journey of your project.
2. Use text to define every step of the journey.
3. Use drawing/images to add details to every step, paying attention to the crucial steps of the journey.
4. Note down pain point and opportunities emerging.

Ecosystem Map

DEVELOP

The Ecosystem Map is an immersive, synthetic visualization that captures all stakeholders and value exchanges within a service ecosystem. Participants arrange avatars or 3D tokens to represent individuals, organizations, technological components, and environmental elements in a looping network, then animate flows to trace information, resource, or interaction exchanges.

In VR or 3D platforms, collaborators navigate the spatial model, simulate adding or removing nodes, and observe systemic impacts in real time. Observers annotate insights and co-design strategic interventions on the fly. Perfect for high-collaboration workshops, the Ecosystem Map aligns diverse perspectives, uncovers hidden relationships, and drives holistic service strategy through richly immersive co-creation.

Ecosystem Map

DEVELOP

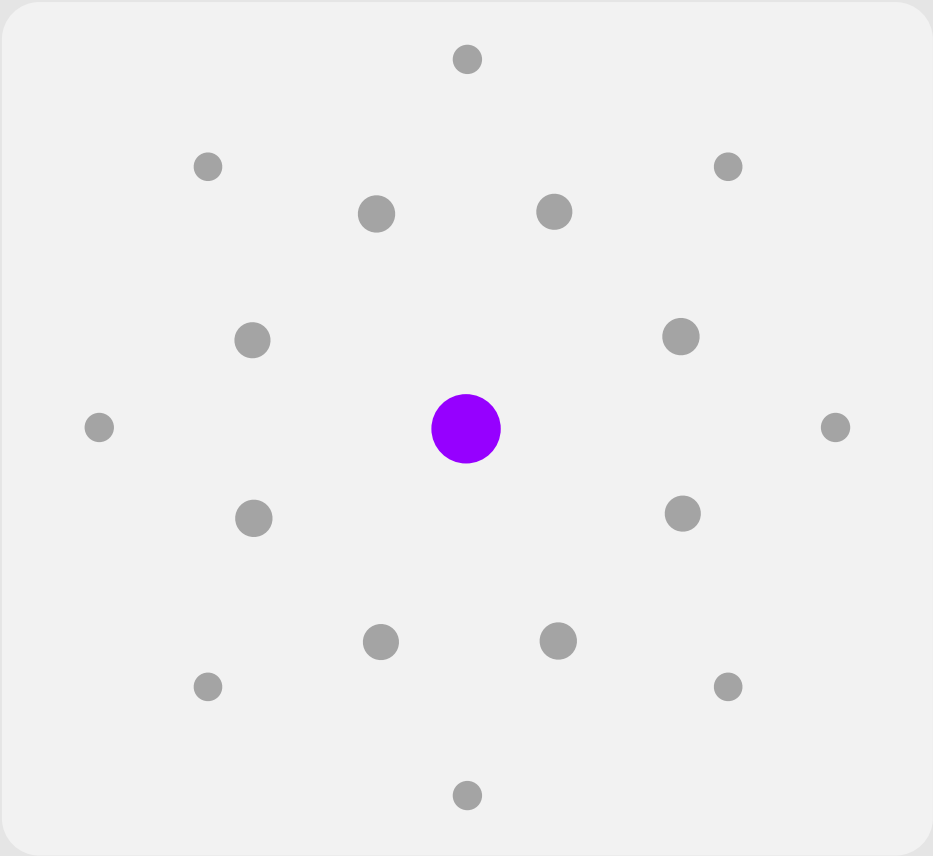
Describe all the players involved and place them in the map, central are key players, peripheral are the less important.











How to use it?

1. Define a central user and put it at the center of the canvas.
2. Describe relevant players and associate to each a different shape.
3. Place shapes in the map.
4. Central players should be placed close to the center, secondary players peripherically.

Future Backcasting

DEVELOP

Future Backcasting is a foresight tool that reverses time to identify pathways from desired future outcomes back to present-day actions within virtual worlds. Participants embody avatars representing future stakeholders to enact scenarios in 3D or VR environments, dramatizing how emerging trends and innovations influence service evolution.

By simulating and discussing milestones—policy shifts, technological breakthroughs, user behaviors—teams map backward through decision points, uncovering present-day interventions and design inspirations. This method fosters long-term thinking, anticipates challenges, and aligns organizational vision by translating futures into actionable roadmaps. Ideal for co-creative workshops in VR or virtual platforms, Future Backcasting drives foresight and strategic innovation.

Future Backcasting

DEVELOP

Topic/Industry: _____

Year: _____

Describe your foresight

Describe the steps to reach it

Possible

Plausible

Probable

Preferred

How to use it?

1. Identify a relevant topic or a relevant industry.
2. Define a year in the future to set the backcasting.
3. Decide in which category of future (Possible, Plausible, Probable, Preferred) the backcasting will be set.
4. Describe the foresight.
5. Describe which steps are needed to achieve the foresight.

System UX Map

Human Agent Journey

DEVELOP

Human Agent Journey visualizes the step-by-step path a person takes to achieve a goal, illustrating agent, scenario, expectations, phases, actions, and insights in an immersive virtual environment. Participants embody an avatar representing the human agent and progress through journey stages—awareness, exploration, decision, fulfillment, and reflection—within a shared 3D or VR space.

Observers annotate key touchpoints, emotional states, and backstage processes in real time, then pause to highlight pain points or design opportunities. By spatializing each phase and mapping opportunities directly onto the journey, this method fosters empathy, aligns stakeholders around human motivations, and accelerates co-creation of service experiences shaped by real user needs.

System UX Map Human Agent Journey

DEVELOP

Human agent		Scenario			Expectations	
Phases	Phase 01	Phase 02	Phase 03	Phase 04	Phase 05	
Actions High-level behaviors and steps taken by users. They have a narrative scope, they're not meant to be a step-by-step log of every discrete interaction.						
Opportunities						

How to use it?

1. Define a human agent (user)
2. Identify a scenario and expectations
3. Break down the user journey in phases and list them.
4. Define which actions (High-level behaviors and steps taken by users. They have a narrative scope, they're not meant to be a step-by-step log of every discrete interaction) the human agent will perform.
5. Identify emerging opportunities.

Future-State Journey

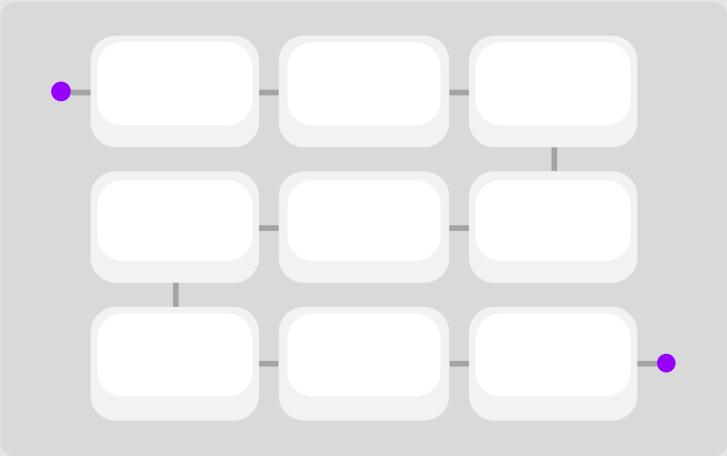
DEVELOP

Future-State Journey uses narrative structures to guide co-creative exploration of envisioned service experiences. Participants apply the classic dramatic arc—exposition, rising action, climax, falling action, resolution—to a future-state customer journey mapped three to five years ahead. In virtual 3D or VR environments, collaborators embody avatars to spatialize journey stages, enact critical moments, and iterate plot-driven touchpoints.

By dramatizing emotional peaks and challenges, teams spark innovative ideas, uncover pivotal design opportunities, and maintain focus on strategic objectives. Ideal for immersive workshops, this method balances storytelling, spatial roleplay, and moderate collaboration, facilitating cohesive stakeholder alignment and rapidly accelerating future-focused ideation.

Future-State Journey

DEVELOP



Define a user journey or, if present, consider an existing one for this exercise. Focus on the emotional peaks and challenges arising from the experience.

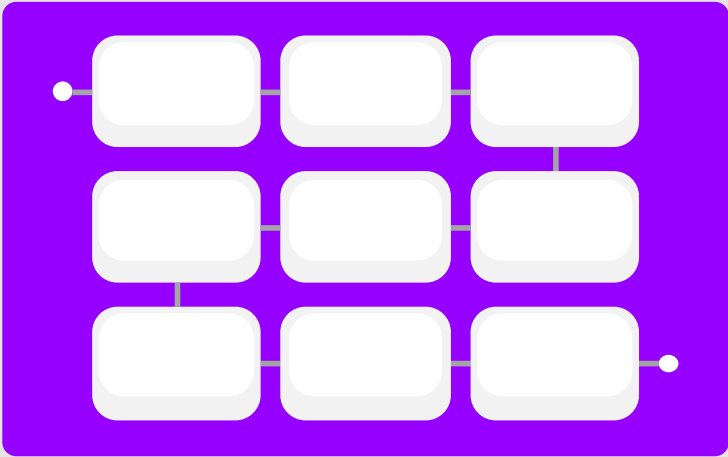
Identify where there is room for Jobs To Be Done (JTBD) and highlight it on the map



Now, rework the user journey imagining the experience in the future. How can JTBD be addressed by future developments?

Identify which are the emerging opportunities

_____	_____	_____	_____
_____	_____	_____	_____



How to use it?

1. Define a user journey or, if present, consider an existing one for this exercise. Focus on the emotional peaks and challenges arising from the experience.
2. Identify where there is room for Jobs To Be Done (JTBD) and highlight it on the map .
3. Now, rework the user journey imagining the experience in the future. How can JTBD be addressed by future developments?
4. Identify which are the emerging opportunities.

Innovative Brainstorming

DEVELOP

Innovative Brainstorming is an inclusive, fast-paced ideation technique that stimulates spontaneous thought by leveraging spatialized virtual tools and avatar-led interaction. In a VW workshop, participants converge on a shared digital whiteboard or 3D canvas, where facilitators introduce provocations, constraints, or stimulus cards.

Avatars then rapidly generate, cluster, and remix ideas through drawing, tagging, and connecting virtual sticky notes, while voice or gesture commands add energy and variety. Real-time voting and theme-based breakout areas help surface promising concepts. By combining classic free-form brainstorming with immersive, gamified mechanics, Innovative Brainstorming boosts engagement, taps collective creativity, and fuels a rich pipeline of breakthrough service innovations.

Warming Up

Brainstorm any idea related to the topic in question

The Braindump

More or less spontaneous ideas generated within close personal or obvious contexts

Divergent Thinking

Ideas inspired by one or two obvious thoughts, generated by the braindump, as well as new insights inspired by creative flow

Creative Ideation

Most creative ideas generated from new, divergent thoughts, breaking free from existing conventions or obvious contexts

How to use it?

1. Define a topic to brainstorm.
2. Brainstorm any idea related to the topic in question in the warming up section.
3. Select ideas within close personal or obvious contexts and list them in the braindump section.
4. Use braindump ideas to inspire new ideas going in different . directions and list them in the divergent thinking section.
5. Use the most promising ideas from the divergent thinking section to create new creative ideas in the creative ideation section.

Integrated Journey

DEVELOP

Integrated Journey extends traditional journey mapping into a comprehensive service blueprint within virtual worlds, visualizing customer touchpoints alongside backstage processes, technology systems, and stakeholder roles. In an immersive 3D environment, designers arrange avatars, swimlanes, and interactive nodes on a shared timeline to show how front-stage interactions trigger behind-the-scenes support functions and data flows.

Participants witness real-time animations of handoffs, decision points, and policy enforcements, pausing to annotate inefficiencies or propose enhancements. Avatars can enact role-specific perspectives—agent, IT, logistics—adding realism. Perfect for VR-enabled co-creation workshops, Integrated Journey aligns multidisciplinary teams, uncovers interdependencies, and accelerates holistic service innovation.

Integrated Journey

DEVELOP

Phases Key, high level stages of the service experience	Phase 01	Phase 02	Phase 03	Phase 04	Phase 05
Touchpoints Devices, places, tools, perceivable clues that users interact with.					
Technical Journey Steps and activities that the technical artifact (platform, website, machine, etc.) performs behind the scenes to support interactions with/between human agents.					
User Journey Steps, choices, activities, and interactions that users perform while interacting with a service to reach a particular goal.					
Provider Journey Steps, choices, activities, and interactions that providers perform while offering a service to reach a particular goal (they can be visible to users or performed in the back-end / asynchronously).					
Opportunities					

How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Define, for each phase which are the touchpoints (Devices, places, tools, perceivable clues that users interact with) involved.
3. Define, for each phase, the technical journey (Steps and activities that the technical artifact performs behind the scenes to support interactions with/ between human agents.)
4. Define, for each phase, the provider journey (Steps, choices, activities, and interactions that providers perform while offering a service to reach a particular goal, they can be visible to users or performed in the back-end / asynchronously).
5. Identify emerging opportunities.

Journey Ideation with Dramatic Arcs

DEVELOP

Journey Ideation with Dramatic Arcs is a co-creation method that applies narrative structures to service design in virtual worlds. Teams leverage classic dramatic arcs to outline user journeys, mapping emotional peaks and transitions across touchpoints.

In immersive 3D or VR environments, participants embody avatars to spatialize journey stages, visually enact pivotal moments, and explore plotlines. Observers refine service concepts by injecting unexpected challenges, resolving friction, and imagining future scenarios.

This approach deepens empathy, sparks insights, and aligns stakeholders around rich narratives. Ideal for future-focused workshops, it transforms abstract journeys into engaging storyworlds for iterative ideation.

Journey Ideation with Dramatic Arcs

DEVELOP



Customer engagement

Color the numbers ranking the customer engagement levels of every step of your journey from 1 (Low) to 6 (High)



Reflect on the shape and rhythm of the whole arc. Is it overloaded? Frontloaded? Are the periods of low engagement or high engagement too long?

Must a highlight be added, or - this is often more practical - should a less engaging step be spotlighted to increase engagement and show value more clearly?

How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Color the numbers ranking the customer engagement levels of every step of your journey from 1 (Low) to 6 (High).
3. Reflect on the shape and rhythm of the whole arc. Is it overloaded?
Frontloaded? Are the periods of low engagement or high engagement too long?
4. Must a highlight be added, or - this is often more practical - should a less engaging step be spotlighted to increase engagement and show value more clearly?

Service Image

DEVELOP

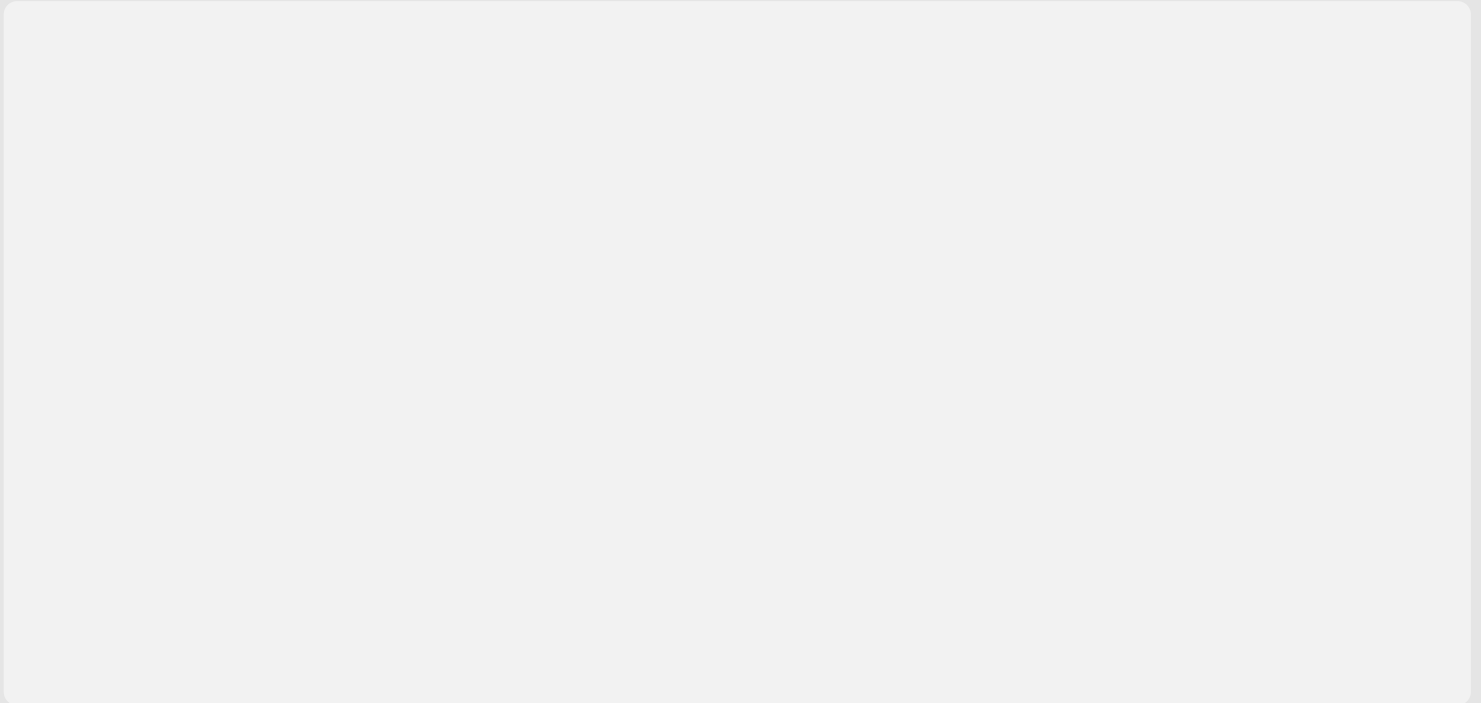
Service Image distills the essence of a service experience into a single, impactful visual snapshot within a virtual world. Designers stage a 3D scene with avatars, environmental cues, and animated highlights to convey core touchpoints and emotional tone at a glance. This diorama-style frame employs perspective, lighting, and symbolic elements to communicate user motivations, pain points, and moments of delight cohesively.

By presenting an evocative north-star vision, Service Image aligns stakeholders around the narrative, sparks creative ideation, and guides subsequent design iterations. Ideal for kickoff sessions, pitches, and virtual galleries, it crystallizes complex experiences into an instantly sharable form.

Service Image

DEVELOP

The service image is aimed at presenting a concept in a memorable way, by helping the audience immediately understand, perceive, immerse into the envisioned experience. The service image is often realistic (e.g. a montage of different photos and scenes, or a post-produced photo realised ad hoc) and focused on a hero moment that is able to encapsulate the core value of the service experience.



How to use it?

1. Create a service image, it can be a montage of different photos and scenes, or a post-produced photo realized ad hoc, focused on a hero moment that is able to encapsulate the core value of the service experience.

System UX Map Artificial Agent Journey

DEVELOP

System UX Map Agent Journey visualizes AI/ML system interactions and human collaboration within virtual worlds. Participants guide avatars representing data pipelines, models, and human operators across a spatial timeline that highlights when core AI elements—data ingestion, feature engineering, model training, inference—are generated and required.

Relationships between automated agents and human stakeholders are dynamically mapped, enabling stakeholders to pause, annotate, and adjust nodal connections in real time. Ideal for VR or 3D workshops with multidisciplinary teams, this tool clarifies technical workflows, uncovers integration bottlenecks, and fosters shared understanding. By combining agent-driven storytelling with immersive simulation, teams co-design robust, human-centered AI services.

System UX Map Artificial Agent Journey

DEVELOP

Phases	Phase 01	Phase 02	Phase 03	Phase 04	Phase 05
Key, high level stages of the service experience					
Touchpoints					
Devices, places, tools, perceivable clues that users interact with.					
Technical Journey					
Steps and activities that the technical artifact (platform, website, machine, etc.) performs behind the scenes to support interactions with/between human agents.					
User Journey					
Steps, choices, activities, and interactions that users perform while interacting with a service to reach a particular goal.					
Artificial Journey					
Internal processes and interactions that support service delivery through the technical artifact. They involve the agency of AI systems.					

Opportunities					
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How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Define, for each phase which are the touchpoints (Devices, places, tools, perceivable clues that users interact with) involved.
3. Define, for each phase, the technical journey (Steps and activities that the technical artifact performs behind the scenes to support interactions with/ between human agents).
4. Define, for each phase, the artificial journey (Internal processes and interactions that support service delivery through the technical artifact. They involve the agency of AI systems).
5. Identify emerging opportunities.

User Scenario

DEVELOP

User Scenarios bring envisioned service experiences to life through compelling narratives that follow a user's journey in context. In a virtual 3D or VR environment, avatars embody personas and enact stories that illustrate goals, motivations, and pain points at each stage of interaction—discovery, decision, execution, and reflection.

Observers and co-designers watch, annotate, and pause the action to probe underlying assumptions, explore alternative paths, or inject new ideas. By weaving storytelling with spatial simulation, User Scenarios deepen empathy, align stakeholder mental models, and reveal hidden requirements. Ideal for co-creative workshops in immersive platforms, User Scenarios seamlessly integrate simulation, roleplay, and narrative ideation into service design.

User Scenario

DEVELOP

A user scenario is a story that describes, in an exemplificatory and narrative manner, how the user is going to interact with the service during a specific situation of everyday life.

Title

Context: _____

Characters: _____

Needs: _____

Scenario

Title

Context: _____

Characters: _____

Needs: _____

Scenario

Title

Context: _____

Characters: _____

Needs: _____

Scenario

How to use it?

1. Define a context for each scenario.
2. Define the characters (e.g. users, providers...) involved in the scenario.
3. Identify the needs involved.
4. Writing a story, define a user scenario in a narrative manner, focusing in describing how the user is going to interact with the service during a specific situation of everyday life.

Rough Prototyping

DEVELOP

DELIVER

Rough Prototyping is a rapid, low-fidelity method for mocking up service ideas using simple virtual assets available on demand in VR or 3D platforms. Teams embody avatars that assemble, rearrange, and annotate digital placeholders—such as basic shapes, sketch overlays, or interactive widgets—to explore concepts in real time.

By minimizing production effort, participants test multiple variations, iterate service touchpoints, and gather immediate feedback without heavy technical overhead. Although roleplay depth is limited compared to immersive simulations, Rough Prototyping excels at fostering spontaneous creativity, aligning stakeholder understanding, and validating design assumptions. This high-velocity approach empowers teams to quickly brainstorm and converge collaboratively.

Rough Prototyping

DEVELOP

DELIVER

Touchpoints

Devices, places, tools, perceivable clues that users interact with.

Requirements

Paper mockups

Digital mockups

How to use it?

1. Define, which are the main touchpoints (Devices, places, tools, perceivable clues that users interact with) involved in the project.
2. For each touchpoint, define the technical requirements.
3. Create paper/digital mockups for all the touchpoints and start experimenting/testing the user journey.

Experience Prototypes

DEVELOP

DELIVER

Experience Prototypes are interactive simulations of key service touchpoints within virtual worlds. They let teams rapidly prototype and test specific moments in a journey—such as checkout kiosks, support chatbots, or onboarding flows—by building high-fidelity mock-ups in VR or 3D spaces.

Participants embodied as avatars interact with digital artifacts, providing real-time feedback on usability, emotional resonance, and process efficiency. Through iterative cycles, designs are refined on the fly, uncovering hidden pain points and validating solutions before development. Ideal for virtual co-design workshops, Experience Prototypes enhance immersion, align stakeholders around tangible interactions, and accelerate service innovation within a holistic end-to-end context.

Experience Prototypes

DEVELOP

DELIVER

User Journey

Touchpoints

Devices, places, tools,
perceivable clues that
users interact with.

Prototypes

How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Define, for each phase which are the touchpoints (Devices, places, tools, perceivable clues that users interact with) involved.
3. Prototype, for each phase, the user journey and start experimenting/testing the touchpoints.

Role Playing

DEVELOP

DELIVER

Role Playing brings a hypothetical service to life through avatar enactment in virtual worlds. Users assume persona roles—customers, frontline staff, or partners—and act out journey scenarios in immersive VR or 3D environments. As avatars, participants navigate scripted or spontaneous interactions, responding to prompts, making decisions, and adapting to system feedback.

Observers can pause, annotate, and adjust scenarios on the fly to explore alternative behaviors, emotional responses, and process variations. This high-engagement method fosters deep empathy, surfaces usability issues, and validates service flows before development. Ideal for remote co-creation workshops, Role Playing aligns multidisciplinary teams around user perspectives and informs iterative design improvements.

Role Playing

DEVELOP

The role play typically requires to define some roles (e.g. the user, the service employee, etc.) and prepare rough prototypes or other materials that can facilitate the performance. While a team is acting out their story, the rest of the audience learn about the idea, understand the high-level sequence of actions required and get to know the hero moments.

Scenario

Context: _____

Characters: _____

Needs: _____

Scenario

Act!

Hero Moments

Exceptional experiences that create a lasting positive impression on users, highlighting the core value of the service.

How to use it?

1. Create a scenario: define the context, the characters and the needs involved and narrate through a story the scene.
2. Define some roles (e.g. the user, the service employee, etc.) and assign them to the participants.
3. If needed, prepare rough prototypes or other materials that can facilitate the performance.
4. While a team is acting out their story, the rest of the audience learn about the idea, understand the high-level sequence of actions required and get to know the hero moments.
5. List the hero moment(s).

Desktop System Mapping

DELIVER

Desktop System Mapping, known as Business Origami, is a tactile method for visualizing complex value networks by arranging simple paper cutouts—or, in virtual worlds, draggable avatars and 3D tokens—on a shared collaborative workspace. Participants represent key people, locations, channels, and touchpoints with standardized symbols, connecting elements to reveal relationships, dependencies, and information flows.

In VR or immersive 3D platforms, collaborators reposition tokens, annotate linkages, and simulate network changes in real time. This approach clarifies service ecosystems, aligns stakeholder mental models, and fosters collective sense-making. Desktop System Mapping excels at uncovering structural insights, driving collaborative strategy, and achieving strategic alignment.

Desktop System Mapping

DELIVER

Scope Definition

What do you want to prototype?

Specificity Definition

Do you want to prototype the whole service? How detailed?

Create paper or digital cutouts to prototype



How to use it?

1. Define the main scope of your prototype
2. Define the level of detail of the prototype
3. Create paper/digital cutouts of the prototype and start testing/simulate talking points using the models on the table.

Desktop Walkthrough

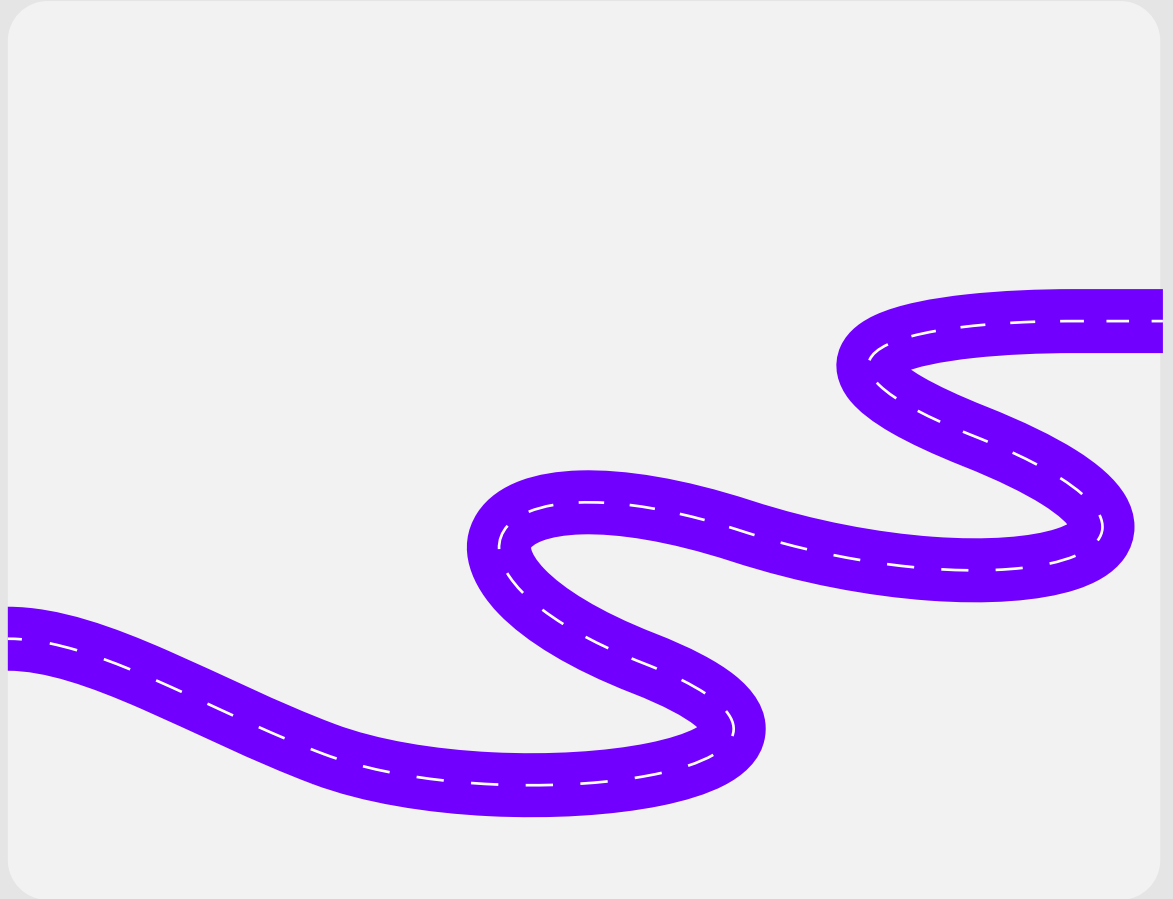
DELIVER

Desktop Walkthrough is a low-fidelity prototyping tool that brings teams together around a shared simulation of a service journey in a virtual world. Participants embody avatars to step through each critical touchpoint—sign-up, payment, support—while observers annotate pain points, decision triggers, and contextual cues.

By projecting simple mock-ups of screens, environments, and process steps into a 3D or VR space, teams quickly gain a unified understanding of end-to-end experiences and surface hidden issues. Iterative “play-throughs” enable real-time adjustments to sequences, handoffs, and interface layouts. Ideal for early-stage co-creation workshops, Desktop Walkthrough accelerates alignment, empathy, and rapid identification of critical journey enhancements.

Desktop Walkthrough

DELIVER



How to use it?

1. Define the user journey of your project and create a visual representation of it using emojis/imported images

Emotional Journey Feedback

DELIVER

Emotional Journey Feedback extends the System UX Map by overlaying users' emotional states across every phase of their experience in virtual worlds. A continuous "emotion line" traces peaks and valleys—signaling stress points, moments of delight, and transitional shifts—plotted along a spatialized service timeline.

In VR or 3D environments, avatars convey real-time emotional cues through gestures, facial expressions, or ambient lighting changes that correspond to the graph. Participants can pause, annotate, and iterate scenarios to smooth pain points or amplify positive highlights. Ideal for immersive co-design workshops, this tool deepens empathy, enhances feedback loops, and strengthens narrative-driven storytelling in service innovation.

Emotional Journey Feedback

DELIVER

Phases Key, high level stages of the service experience	Phase 01	Phase 02	Phase 03	Phase 04	Phase 05
Touchpoints Key, high level stages of the service experience					
Technical Journey Steps and activities that the technical artifact (platform, website, machine, etc.) performs behind the scenes to support interactions with/between human agents.					
User Journey Steps, choices, activities, and interactions that users perform while interacting with a service to reach a particular goal.					

😊	
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😊	
😐	
😞	
😫	
😭	

How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Define, for each phase which are the touchpoints (Devices, places, tools, perceivable clues that users interact with) involved.
3. Define, for each phase, the technical journey (Steps and activities that the technical artifact performs behind the scenes to support interactions with/ between human agents.)
4. For each step, consider the emotional feedback of the user and keep track of it in the canvas.
5. Identify emerging pain points and opportunities.

Investigative Rehearsal

DELIVER

Investigative Rehearsal is a theatrical tool that uses iterative roleplay to uncover and refine service behaviors within virtual worlds. Participants embody avatars to act out scenarios—customer interactions, back-end workflows, decision points—while observers note emergent patterns and friction points.

Through multiple rehearsal loops, teams adjust roles, scripts, and environment affordances in real time, testing alternative responses and process variations. This method fosters deep empathy, reveals implicit knowledge, and surfaces systemic issues that workshops might miss. Ideal for VR or richly immersive 3D platforms, Investigative Rehearsal accelerates behavioral insight, aligns stakeholder mental models, and co-designs optimized service experiences grounded in lived enactment.

Investigative Rehearsal

DELIVER

Scene Definition

What do you want to recreate?

Research question

Do you want to find out?

Actors

Roles

Scenario

Observers

1. Watch

Ask each team to play through their scene in just a couple of minutes, to give everyone an overview of what happens

2. Understand

"What do we know already? How do we know that? How are they feeling? What's happening right now?"

3. Change and Iterate

Ask the team to play the scene again, but this time the audience should call "stop" when they have an idea of what could be different on the service side.

Document

[illegible]

How to use it?

1. Define the scene and research question.
2. Assign actors with roles and scenario details.
3. Observers watch a brief scene enactment.
4. Observers reflect on current knowledge and feelings.
5. Replay the scene, pausing to suggest changes and improvements.
6. Document observations and insights throughout.

Rehearsing Digital Services

DELIVER

Rehearsing Digital Services is a variant of Investigative Rehearsal that prototypes digital interfaces through embodied, actor-led simulations in virtual worlds. Participants—represented as avatars—take on customer, agent, or system roles and act out conversational and transactional flows: chatbot dialogs, voice assistants, form interactions, and error recoveries.

Facilitators guide scenarios in VR or 3D platforms, narrating screen states and system prompts aloud as avatars interact with on-screen elements. Iterative enactments expose usability gaps, friction points, and emotional reactions, enabling real-time script tweaks, UI refinements, and branching-logic tests. Ideal for immersive co-creation workshops, Rehearsing Digital Services drives shared understanding, empathy, and alignment around seamless digital service experiences.

Scene Definition

What do you want to recreate?

Research question

Do you want to find out?

Actors

Roles

Scenario

Observers

1. Watch

Ask each team to play through their scene in just a couple of minutes, to give everyone an overview of what happens

2. Understand

"What do we know already? How do we know that? How are they feeling? What's happening right now?"

3. Change and Iterate

Ask the team to play the scene again, but this time the audience should call "stop" when they have an idea of what could be different on the service side.

Service digitalization

After a few iterations, consider how you would digitalize the experience and how you would act it.

How to use it?

1. Define the scene and research question.
2. Assign roles and outline the scenario.
3. Have teams act out the scene briefly to observe.
4. Observe, understand feelings and current dynamics.
5. Iterate by pausing and suggesting changes focused on service digitalization.
6. Reflect on how to digitally transform and enact the service experience.

Service Blueprint

DELIVER

Service Blueprint is a comprehensive mapping technique that visualizes every stage of service delivery—front-stage interactions, backstage processes, support systems, and physical or digital touchpoints—in a unified blueprint. In virtual environments, designers arrange swim-lane structures on a 3D canvas, deploying avatars to simulate customer and staff roles and animating process flows in real time.

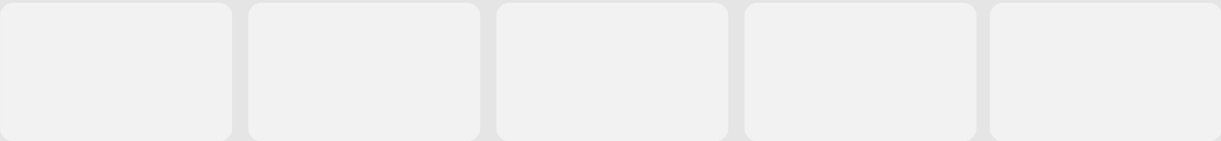
Participants annotate decision gateways, handoffs, and dependencies while observing both visible and hidden service elements. This immersive representation reveals systemic inefficiencies, clarifies ownership, and guides co-design of seamless experiences. Ideal for VR or desktop-based co-creation workshops, Service Blueprint accelerates alignment, optimizes workflows, and de-risks implementation through collective visualization and iteration.

Service Blueprint

DELIVER

User Journey

Steps, choices, activities, and interactions that users perform while interacting with a service to reach a particular goal.



Main User

Line of Interaction



Line of Visibility

How to use it?

1. Break down the user journey in phases and, for each phase define its steps.
2. Define, a main user and secondary users and place them in the other areas.
3. Consider the Interaction Area and place other entities the main user interacts with and the Visibility Area and place players, functionalities invisible to the user.
4. Map connection between the users and define the project ecosystem.

Service Prototype

DELIVER

Service Prototype simulates real user interactions with service touchpoints in virtual environments. Designers create interactive mock-ups—digital kiosks, chatbots, mobile interfaces—and deploy them in VR or 3D worlds.

Participants embody avatars to engage with prototypes as they would in real life: querying a virtual assistant, placing an order through a mock interface, or interacting with augmented customer support. Real-time feedback sessions record usability metrics, emotional reactions, and friction points. Iterative cycles refine prototypes, ensuring functionality, aesthetics, and experience quality align with user expectations. Perfect for immersive co-creation workshops, Service Prototypes accelerate validation, enhance stakeholder feedback, and de-risk service launch.

Service Prototype

DELIVER

Actors

1

2

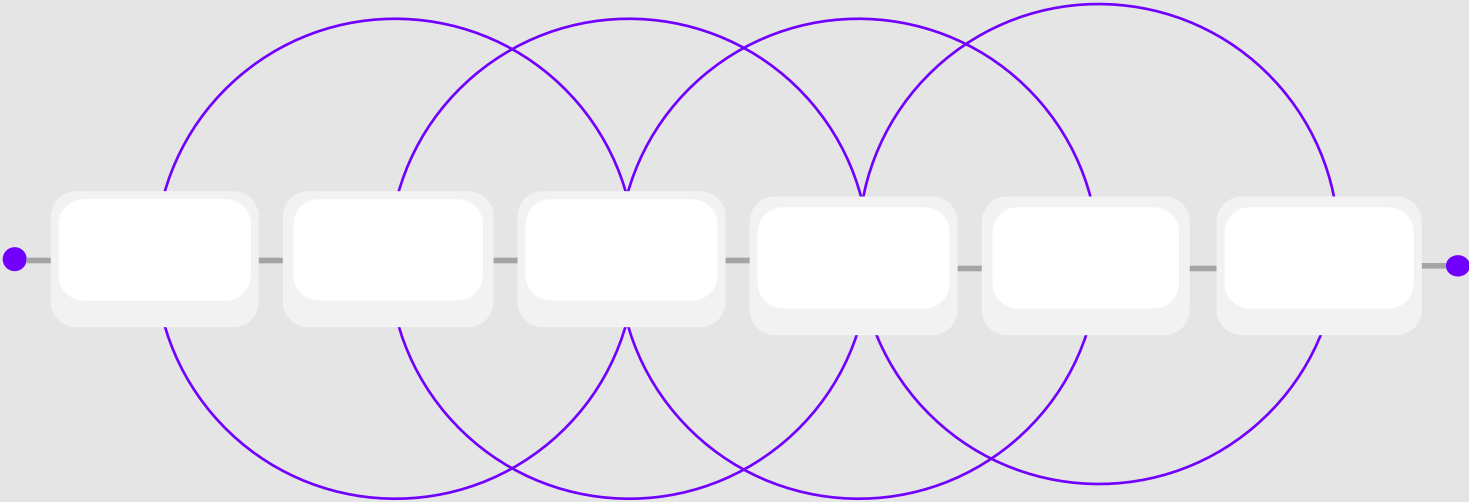
3

Touchpoints

1

2

3



How to use it?

1. Define a precise User Journey and describe it in steps.
2. Assign roles to participants.
3. Choose touchpoints to be prototyped.
4. Reenact the service using the prototypes. This tool has the objective of replicating, as much as possible, the final experience of interacting with the service, in order to test and validate all the design choices.

Subtext

DELIVER

Subtext is a theatrical method that can reveal deeper motivations and needs by focusing on unspoken thoughts in a rehearsal session.

Perfect for exploring non-verbal communication and emotions in VW rehearsals; enhances depth of co-creative exploration.

Subtext

DELIVER

Key Scene Definition

What do you want to recreate?

Actors

1

2

3

Subtext actors

1

2

3

Actors play the keyscene

Actors play the keyscene

Subtext actors play thoughts of the actors

How to use it?

1. Choose a key scene you want to understand more deeply
2. Select and assign roles of actors, who will play the key scene once.
3. Select and assign roles of subtext actors for each actor.
4. The character actors will play the scene as usual – or perhaps a little slower – and the subtext actors will simply speak what they believe their characters are thinking at any moment, using “I” or “me” statements when possible. For example, the character actor might say, “Can you prioritize that?” and his subtext actor might rage, “For f*ck’s sake! Help me before I lose my job, you idiot!”
5. Iterate.