Module 3: Design thinking for green innovation in lake protection and restoration business projects

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Pro Clean Lakes
project at a glance

❖ Mission & Aim: Develop an Action Plan and Guidelines for long-term protection and restoration of European Natural Lakes (ENL)

❖ Demonstration & Monitoring Sites

❖ Adaptive & Participatory Approach

❖ Innovation & Incubation: Support the development of sustainable solutions and business models via a virtual incubator

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Integrated emerging approaches for joint protection and restoration of Natural Lakes in the spirit of European life heritage support

Module 3 — Description (Design Thinking for Green Innovation)

Duration: 4 Weeks (Online) – 4 hours/week

Target Audience: At least 90 participants (≥30 per demo site): business owners & nascent entrepreneurs from ProCleanLakes demo sites

Delivery Mode: Online lectures, recorded content on the Virtual Incubator & Accelerator, case studies, assignments, interactive discussions

Focus: Human-centered design for green innovation in lake protection & restoration

Module 3 — Objectives

Introduce Design Thinking (DT) as an innovative problem-solving approach for sustainable lake protection.

Guide participants in applying human-centered design to address environmental challenges in lake conservation.

Provide tools to develop eco-friendly business solutions that balance economic viability with ecological sustainability.

Encourage interdisciplinary collaboration and co-creation to drive innovative lake restoration strategies.

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Module 3 — Learning Outcomes

Understand and apply DT principles to green innovation in lake conservation.

Utilize user-centered research to define key challenges in water sustainability.

Develop eco-innovative solutions that integrate environmental, social, and economic values.

Use iterative feedback loops to refine business concepts for impact-driven results.

Week 1: Introduction to Design Thinking for Sustainability — Topics

Design Thinking (DT) — a human-centered approach to innovation

The role of DT in sustainable entrepreneurship and lake restoration

Five stages of the DT process: Empathize, Define, Ideate, Prototype, Test

Week 1: Coaching Session — Activities

Case Study Discussion: Application of DT in water conservation startups

Assignment: Identify a demo site lake restoration challenge and describe how DT could address it

Module description

❖ This module introduces Design Thinking (DT) as a strategic methodology for addressing complex environmental challenges in lake protection and restoration.

❖ Participants learn to apply human-centered design to eco-innovation, ensuring solutions respect ecosystems while supporting local economies.

❖ Emphasis on practical tools, field-based insights, and collaborative green entrepreneurship.

Module key components

❖ Human-centered research for environmental problem-solving.

❖ Techniques to design sustainable and scalable eco-businesses.

❖ Integration of ecosystem science, stakeholder needs, and innovation processes.

❖ Hands-on exercises to foster creativity and systems awareness.

Module objectives

❖ Provide a deep understanding of DT principles and their relevance for environmental innovation.

❖ Enable participants to define core ecological problems using user-centered data.

❖ Develop capabilities to create sustainable prototypes aligned with lake ecosystem dynamics.

❖ Improve collaboration among communities, scientists, entrepreneurs, and policymakers.

Module outcomes

❖ Ability to conduct empathy-driven research with affected users and stakeholders.

❖ Skill to frame sustainability challenges using evidence-based definitions.

❖ Capacity to produce green, innovative business concepts balancing environmental and economic constraints.

❖ Confidence in using iterative feedback loops to test and evolve solutions.

https://www.youtube.com/watch?v=5Ga7goOq1i4

Week 1 Introduction

❖ Week 1 provides the foundation of DT and its role in sustainability.

❖ Participants develop a clear understanding of how DT supports lake conservation.

❖ Introduction of tools used throughout the module.

What is Design Thinking?

❖ A non-linear, iterative approach to problem solving that prioritizes user needs.

❖ Originates from design disciplines but expanded to business, sustainability, and public innovation.

❖ Helps uncover hidden assumptions and generate creative, eco-friendly solutions.

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Core Principles of DT

❖ Empathy: Understanding needs from multiple perspectives.

❖ Experimentation: Rapid testing and adaptation.

❖ Collaboration: Bringing actors together for co-creation.

❖ Sustainability alignment: Ensuring solutions respect ecological boundaries.

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Environmental Complexity & DT

❖ Lakes function as socio-ecological systems influenced by human behavior.

❖ Sustainable solutions require both ecological understanding and social insight.

❖ DT bridges science, innovation, and community participation.

Human-Centered Approach Explained

❖ Focuses on the lived experiences of individuals affected by lake degradation.

❖ Ensures interventions are relevant, accepted, and sustainable.

❖ Encourages inclusive green innovation.

Human-Centered Approach Explained

❖ Green entrepreneurship helps convert environmental problems into business opportunities.

❖ DT supports nature-based, regenerative business models.

❖ Creates long-term social and environmental value.

Why DT for Lake Protection?

❖ Lake ecosystems involve multiple interconnected issues: pollution, biodiversity loss, tourism pressure.

❖ DT helps uncover user needs: fishermen, local communities, tourists, environmental agencies.

❖ Leads to creative solutions that integrate ecological restoration with viable business models.

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DT in Eco-Innovation

❖ Supports development of technologies and services protecting lake ecosystems.

❖ Promotes solutions like eco-tourism, eco-filtration systems, wetland regeneration.

❖ Ensures innovations are both impactful and economically feasible.

DT and the Sustainability Triple Bottom Line

❖ Environmental sustainability: Conservation and restoration impact.

❖ Social sustainability: Community well-being and participation.

❖ Economic sustainability: Revenue models supporting interventions.

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DT and Stakeholder Engagement

❖ Lake ecosystems involve farmers, tourism actors, municipalities, NGOs, policymakers.

❖ Understanding stakeholder motivations helps design more effective interventions.

❖ Collaborative innovation ensures long-term adoption.

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The 5 DT Stages – Overview

❖ **Empathize:** Explore needs, emotions, experiences.

❖ **Define:** Synthesize findings into clear problem statements.

❖ **Ideate:** Generate varied and creative solution options.

❖ **Prototype:** Transform ideas into tangible models.

❖ **Test:** Validate concepts with users and refine.

Continuous innovation in practice for Sustainable Green Business Models

- ❖ Semi-structured interviews with community members.

- ❖ Shadowing daily activities near lakes.

- ❖ Environmental observation protocols.

- ❖ Photo-ethnography documenting degradation patterns.

Continuous innovation in practice for Sustainable Green Business Models

❖ Primary stakeholders: Local communities, fishermen, authorities.

❖ Secondary stakeholders: NGOs, scientists, entrepreneurs.

❖ Tertiary stakeholders: Tourists, investors, environmental bodies.

❖ Mapping reveals relationships, power, influence, conflicts.

Stage 2: Define – Deep Dive

❖ Transform scattered insights into meaningful problem definitions.

❖ Use data clustering, insight statements, systems mapping.

❖ Proper problem framing determines solution effectiveness.

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Problem Definition Tools

❖ Insight clustering (affinity mapping).

❖ 5 Whys for root cause discovery.

❖ Systems mapping to understand ecological linkages.

❖ Reframing problems through sustainability lenses.

'How Might We' – Detailed

- ❖ Transforms problems into opportunity questions.

- ❖ Encourages open thinking without constraints.

- ❖ Essential bridge between research and ideation.

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Stage 3: Ideate – Deep Dive

❖ Brainwriting (6-3-5 method).

❖ SCAMPER for solution transformation.

❖ Reverse brainstorming.

❖ Role-storming (imagining decisions from other perspectives).

Ideation Techniques – Detailed

❖ Encourages radical thinking for sustainable solutions.

❖ Moves beyond traditional restoration techniques.

❖ Promotes creativity through structured ideation tools.

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Green Innovation Ideas for Lakes

❖ Nature-based solutions (floating wetlands, buffer strips).

❖ Eco-tourism circuits focused on biodiversity.

❖ AI-supported water monitoring systems.

❖ Circular economy solutions using lake biomass.

Stage 4: Prototype – Deep Dive

❖ Prototypes allow testing feasibility early.

❖ Create low-cost versions of green business ideas.

❖ Helps visualize ecological interventions.

Types of Prototypes

- ❖ Paper sketches of eco-business models.

- ❖ Small-scale physical models (e.g., wetland modules).

- ❖ Digital tools or apps for lake monitoring.

- ❖ Roleplay prototypes for service experiences.

Stage 5: Test – Deep Dive

❖ Present prototypes to stakeholders for feedback.

❖ Assess environmental, social, and economic impacts.

❖ Collect data to refine or pivot ideas.

Testing Methods

❖ Structured user feedback interviews.

❖ A/B testing of eco-intervention options.

❖ Scenario simulations.

❖ Ecological feasibility assessments with experts.

Iteration & Continuous Improvement

❖ DT is not linear; constant feedback drives better solutions.

❖ Iteration helps adapt solutions to real-world ecological constraints.

❖ Reduces implementation risks in restoration projects.

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Case Study: Water Startup (Detailed)

❖ Startup used DT to design water filtration system.

❖ Conducted empathy research with local communities.

❖ Prototyped filtration units using low-cost materials.

❖ Scaled solution after positive field testing.

Case Study: Lessons for Participants

❖ Importance of understanding real user struggles.

❖ Value of low-cost rapid prototyping.

❖ Impact of continuous iteration.

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Week 1 Activity: Case Study Analysis

❖ Groups evaluate DT steps used.

❖ Identify sustainability outcomes.

❖ Discuss applicability for lake challenges.

Empathy Map Exercise – Expanded

❖ Participants choose a lake-related stakeholder.

❖ Document thoughts, actions, motivations, frustrations.

❖ Develop a holistic understanding of user experience.

Worksheet: HMW – Expanded

- ❖ Convert lake issues into actionable opportunities.

- ❖ Examples provided to inspire ideation.

- ❖ Prepares participants for Week 2 fieldwork.

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Week 1 Assignment – Detailed

❖ Identify one significant lake challenge in your demo site.

❖ Use empathy and HMW tools to frame the problem.

❖ Prepare a short presentation summarizing insights.

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It is time for an open discussion - feel free to raise any questions, comments, or ideas.

Trainer

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