Group Work Exercise

AI Solutions Lab: Designing within the Doughnut

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SAG Part 3

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Workshop Mission

You are sustainability consultants.

Your client needs an AI solution that:

- Operates within planetary boundaries
- Strengthens social foundations
- Makes economic sense

You have **90 minutes** to develop a proposal.

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Workshop Structure

Phase	Duration	Activity
Setup	10 min	Challenge selection & team formation
Design	30 min	Solution development in breakouts
Ethics	15 min	Ethical evaluation framework
Present	15 min	Rapid-fire presentations
Synthesis	15 min	Pattern recognition
Close	5 min	Reflection & voting

Your Workspace

Miro Board Structure:

- Each group has dedicated workspace
- All templates pre-loaded
- Reference materials available
- Shared synthesis area

Phase 1: Challenge Selection

10 Minutes

Choose your mission

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Five Real-World Challenges

Each group receives **one challenge card**:

1. **Manufacturing** - Reporting compliance for Austrian Company
2. **Housing** - Energy optimization without surveillance
3. **Just Transition** - Coal region workforce transformation
4. **Circular Economy** - E-waste in electronics retail
5. **Agriculture** - Small farm sustainability

Selection Process:

- Random break-out groups in teams

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What You'll Receive

In Your Miro Workspace:

- Detailed challenge card with constraints
- Solution design templates
- Impact estimation tools (simplified)
- Ethical evaluation framework
- Presentation prep box

Key Constraints:

- Limited budget
- Real stakeholders
- Austrian/EU context
- Specific timeline

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Preparation

Key Questions for Solutions

1. **Scale Management**: How to capture efficiency without enabling overconsumption?
2. **Equity Integration**: How to ensure benefits reach those most in need?
3. **Lifecycle Thinking**: How to account for full system impacts?
4. **Governance Frameworks**: What policies prevent negative outcomes?

Design Principles

- Absolute targets, not just efficiency metrics
- Accessibility requirements from inception
- Transparent impact measurement
- Democratic control of data and algorithms

Remember: Technology is neutral - deployment determines impact

Phase 2: Solution Design

30 Minutes (Breakout Rooms)

Build your proposal

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Design Sprint Structure

Part A: Problem Analysis

- Current state metrics
- Root causes
- Key affected groups
- One "killer fact" that justifies AI

Part B: AI Solution

- What it does (simple terms)
- Data requirements
- Implementation timeline
- Technical complexity level

Part C: Impact Estimation

- Environmental: Better or worse?
- Social: Who wins, who loses?
- Economic: Does it pay back?

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Solution Design Tips

Keep It Simple:

- You're not building the AI, you're proposing it
- "Black box" descriptions are fine
- Focus on outcomes, not algorithms

Think in Patterns:

- Prediction → "AI predicts X to prevent Y"
- Optimization → "AI finds best combination of..."
- Classification → "AI identifies/sorts..."
- Automation → "AI handles routine task of..."

Quantify with Ranges:

- "10-25% improvement"
- "€50-200k investment"
- "6-12 month payback"

When stuck: What would a human expert do? Can AI do it faster/better/cheaper?

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Impact Estimation: Environmental

🌍 Environmental Impact

Rate with traffic lights:

🔴 **Worse** = More energy than saves, increases emissions
🟡 **Neutral** = Efficiency gains offset by AI consumption
🟢 **Better** = Clear net reduction in energy/emissions

Quick check questions:

- How much energy will the AI system use?
- How much energy/resources will it save?
- What's the net effect?

Reference: One server ≈ 100 laptops ≈ 5,000 kWh/year

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Impact Estimation: Social

👥 Social Impact

Rate with traffic lights:

🔴 **Negative** = Jobs lost > created, increases inequality
🟡 **Mixed** = Some win, some lose, unclear net effect
🟢 **Positive** = More opportunities, broader access, fair distribution

Quick check questions:

- Who benefits from this AI?
- Who might be excluded or harmed?
- Does it reduce or increase inequality?

Consider: Jobs, digital access, skills needed, language barriers

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Impact Estimation: Economic

💰 Economic Viability

Rate with traffic lights:

🔴 **Poor** = Payback >3 years or never
🟡 **Acceptable** = Payback 1-3 years
🟢 **Strong** = Payback <1 year

Quick check questions:

- What's the total investment needed?
- What savings/revenue will it generate?
- How quickly does it pay back?

Rule of thumb: If payback > 2 years, need strong non-financial justification

Phase 3: Ethical Evaluation

15 Minutes (Breakout Rooms)

Check your solution

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Three Ethical Tests

1. Necessity Test

Is AI actually needed?

- Could this be solved without AI?
- Is AI the simplest solution?
- What unique value does AI add?

2. Justice Analysis

Who benefits, who bears costs?

- Distribution of benefits
- Distribution of risks
- Power dynamics
- Voice in decisions

3. Governance Check

Who controls what?

- Data ownership
- Algorithm control
- Accountability mechanisms

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Red Flags to Watch For

⚠️ **Warning Signs:**

- ✓ Benefits concentrated → Costs dispersed
- ✓ Vulnerable groups bearing risks
- ✓ No opt-out mechanism
- ✓ Black box decision-making
- ✓ Data extraction without benefit sharing

If you find red flags:
Don't abandon solution - propose safeguards!

Phase 4: Presentations

15 Minutes (Main Room)

Share your solution

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Presentation Format

2 Minutes Per Group - Strict!

30 seconds each for:

1. **Problem**: The killer fact + Why AI?
2. **Solution**: What the AI does + Key impact number
3. **Sustainability**: Environmental/Social/Economic verdict
4. **Ethics**: Biggest risk + Mitigation

Then: 1 minute Q&A (choose one challenge from chat)

Phase 5: Synthesis

15 Minutes

Finding patterns

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Pattern Recognition

Together we'll identify:

Success Patterns

What worked across multiple solutions?

Challenge Patterns

What obstacles appeared repeatedly?

Trade-off Patterns

Which tensions emerged consistently?

Use sticky notes in shared Miro space.

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Connecting to Course Frameworks

Session 1: Planetary Boundaries

- Which solutions help stay within ecological ceiling?
- Which might push us further into overshoot?
- Where do we see rebound effects?

Session 1: Social Foundation (Doughnut)

- Which solutions strengthen social foundations?
- Which might create new deprivations?
- Who is left behind?

Session 2: Business Ethics & Responsibility

- Are we creating value or extracting it?
- Who is responsible when AI fails?
- What would ethical business practice look like here?

Phase 6: Closing

5 Minutes

Reflection

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Reflection

Three Quick Questions:

1. **Which AI application would you champion in your organization?**
2. **Which AI application would you reject?**
3. **What's your key insight from today?**

Post responses in Miro reflection space.

Takeaways

What You've Practiced:

- ✅ Rapid problem analysis
- ✅ Solution design under constraints
- ✅ Impact estimation (even with uncertainty)
- ✅ Ethical evaluation frameworks
- ✅ Recognizing affected groups
- ✅ Trade-off recognition

Key Insight:

AI is neither good nor bad for sustainability.
It's a powerful amplifier that requires careful design and governance.