**Initial Problem Statement**

**How might we design an office chair that enhances user comfort, supports ergonomic health, and incorporates sustainable materials?**

**Concept Space (C)**

Initial Concept:

* **C0:** "An office chair that enhances comfort, supports ergonomic health, and is made from sustainable materials."

Expanding the Concept Space:

* **C1:** An office chair with adjustable lumbar support.
* **C2:** An office chair that automatically adjusts to the user's posture.
  + **C2.1:** Exploring sub-concepts of automatic adjustment, such as pressure sensors and smart materials.
* **C3:** An office chair made entirely from recycled materials.
  + **C3.1:** Identifying specific recycled materials that could be used, such as recycled plastics or bamboo.
* **C4:** An office chair with integrated climate control (heating and cooling).

**Knowledge Space (K)**

Initial Knowledge:

* **K0:** Existing knowledge about ergonomic design principles.
* **K1:** Materials science knowledge about sustainable and recycled materials.
* **K2:** Mechanical and electronic systems for adjustability.
* **K3:** User preferences and common issues with current office chairs.

**Interaction Between C and K Spaces**

**Application of Knowledge to Concepts (C→K and K→C)**

1. **Testing Feasibility (C→K):**
   * Evaluate the feasibility of automatic adjustment mechanisms using knowledge about sensors and smart materials (C2 → K2).
   * Assess the durability and comfort of recycled materials using materials science knowledge (C3 → K1).
2. **Prototyping and Experimentation (K→C):**
   * Develop a prototype chair with adjustable lumbar support (C1) using ergonomic design principles (K0).
   * Create a prototype with pressure sensors that automatically adjust the chair (C2.1) and test it for user comfort and effectiveness.
3. **Knowledge Expansion (K→K):**
   * Conduct user testing with prototypes to gather data on comfort and ergonomic benefits (K3).
   * Research and document new findings on the performance of sustainable materials in office chair applications (K1).

**Iterative Refinement**

* **Refining Concepts:**
  + Refine the automatic adjustment mechanism to be more responsive and comfortable (C2.1 → K3).
  + Improve the integration of recycled materials to enhance durability without compromising sustainability (C3.1 → K1).
* **Generating New Concepts:**
  + Combine concepts to create a hybrid chair with both automatic adjustment and sustainable materials (C2.1 + C3.1).
  + Introduce new concepts based on insights, such as a modular design that allows users to customize their chair (C6).

**Final Product Concept**

**"An office chair that features an automatic posture adjustment mechanism, is constructed from high-quality recycled materials, and provides automatic adjustment to promote ergonomic health."**