Low Tech Roles & Competencies

To create a competency framework for the LowTech for Sustainability project, we thoroughly explored existing frameworks from various disciplines. Taking inspiration from established models in sustainability, human-centred design, social innovation, open innovation/science, and appropriate technology.

After collecting relevant competency frameworks, the most important competency sets were merged into one framework to

facilitate proper education on implementing the methodology. This framework displayed five clear roles and their corresponding responsibilities for executing a low-tech project.

These roles are presented here:

The Thinker:

The Thinker is an expert in strategic thinking and social innovation. They analyse user needs to drive behavioural change grounded in cultural awareness and self-efficacy.

- Ethics, Territoriality, Future Thinking: social innovation, needs analysis, vision of desirable future.
- System thinking: system approach and complexity science
- User needs analysis
- Awareness of technologies and its relationship to human progress
- Cultural awareness
- Intrapersonal competences/self-efficacy: critical thinking, self-knowledge competences
- People-centeredness and behavioural change: behavioural change

The Conceiver:

The Conceiver excels at problem-solving and innovation, using design methods and critical thinking to address user needs ethically. With a comprehensive understanding of technological progress and socio-technical systems, they navigate complexities while managing interpersonal dynamics with emotional intelligence.

- Understanding and addressing core problems; spotting user needs; multi-criteria assessment and Ethics
- Conceiving: specification elicitation and writing; creativity & innovation (invent); critical thinking
- Design Method (co-design, design approach); design thinking; DFX (repair, all, justice....)
- Knowledge of the state of the art; understanding the process of choice to technological development and progress
- Socio-technical system understanding; quality & tolerance specification; cultural awareness; "territoire" awareness; system approach
- Risk awareness; cost & benefits estimation (not only financial); Interpersonal management & Emotional intelligence.
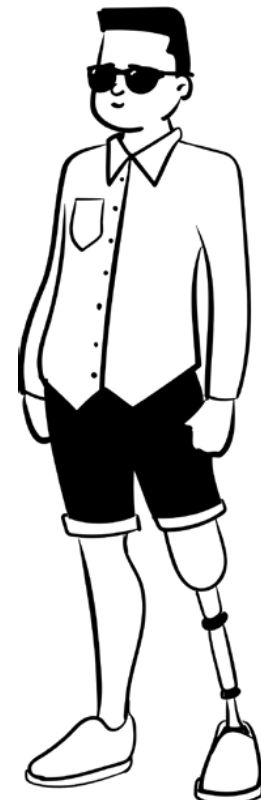
The Maker:

An individual who solves problems through hands-on work, utilising design methods and rapid prototyping to create innovative solutions. They prioritise the use of appropriate technology and ecological ethics. They are culturally and contextually aware and collaborate across disciplines, utilising co-design methods to foster partnerships and collective management of technological choices.

- Design methods; using rapid iterations of prototyping and testing
- Appropriate technology, choices (materials, technologies...); problem solving
- Design behaviour
- Multicriteria assessment & evaluation (social and ecological values; risk awareness)
- Critical traditional technology
- DIY; 3D print
- Cultural and context awareness
- Utilising spheres of responsibility and collective management of technological choices
- Ecological ethics
- Co-design methods; working on cross-functional terms
- Working in an interdisciplinary environment
- Cross fertilisation -> partnerships
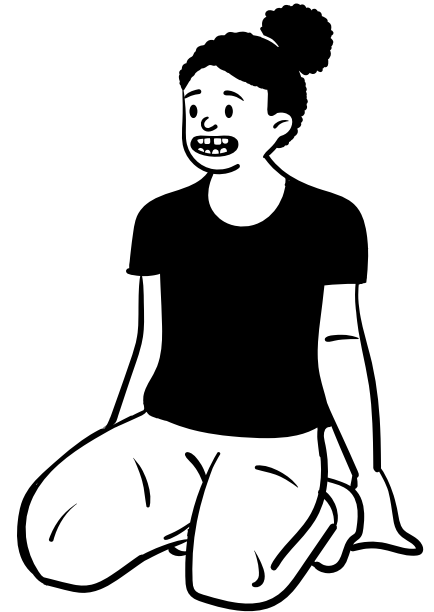
The Facilitator:

They have a keen eye for spotting opportunities and future trends. Strong interpersonal skills help facilitate idea-sharing and collective decision-making while they are aware of cultural sensitivities when navigating technological choices.

- Interdisciplinary skills and working; cross-domain social partnership; opportunity recognition; contextualisation and future vision
- Interpersonal skills; sharing ideas internally; utilizing spheres of responsibility; collective management of technological choices; awareness of technology; managing collaborative process; cultural awareness
- Scaling and replicating ideas
- Understanding and addressing problems of others
- Drivers and formats of social innovation
- Collaboration; participative methods; entrepreneurial skills

The Communicator:

A skilled storyteller who draws inspiration from arts and culture is proficient in communicating ideas effectively while considering the long-term and socio-ecological implications. They encourage open discussions while scrutinising both mainstream and unconventional perspectives, demonstrating emotional intelligence in their approach to sharing knowledge.

- Storytelling; sharing ideas externally; drawing inspiration from arts and culture; understanding of value of LT as well as socio-ecological effects
- Communication skills: non-violent communication ; new media literacy ; multi-directions communication
- Team working ; cultural awareness ; critical thinking
- Analysis of dominant and alternative narratives; emotional intelligence; open knowledge content creation

Identify limits of technology and the challenge

Thinker
Has a deep understanding of the challenges and can develop alternative visions of the future.

- Ethics and Value Thinking
- Futures Thinking
- Systems Thinking
- Strategic Thinking
- People centredness and behavioural challenge

Conceptualise specific problem spaces

Conciever
Works in close collaboration with the thinker to **specify** the problem. Develops requirements akin to specifications

- Creativity and Innovation
- User Needs Analysis
- Design thinking and process
- Knowledge of the state of the art
- Systems Thinking
- Cost/Benefits estimation

Develop low-tech Solutions

Maker
Develops solutions that respect the Low-Tech requirements of uselfness, accesibility and sustainability.

- Design Methods
- Rapid Prototyping
- Material Intelligence
- Collaboration
- Assessment/Feedback
- Spheres of Influence

Make low-tech solutions transferable

Facilitator
Revises the solution and innovates in ways the solution can be scaled to other appropriate locations

- Interdisciplinary skills
- Interpersonal skills
- Opportunity recognition
- Entrepeneurship skills
- Understanding of the drivers and formats of social change

Spread low-tech stories and experiences

Communicator
Explains the low-tech solution to the general public and shares the experiences from the process to inspire others

- Socio-ecological effects
- Understanding the value of low-tech
- Story telling
- New media literacy
- Emotional Intelligence

Low-tech competences	Thinker	Conceiver	Maker	Facilitator	Communicator
Systems thinking	Yes	Yes			Yes
Futures and anticipatory thinking	Yes			Yes	
Values thinking and ethics	Yes				Yes
Strategic thinking	Yes			Yes	
Interpersonal management			Yes	Yes	Yes
Multi-disciplinary problem-solving		Yes	Yes	Yes	
Implementation (Design, Action & Assessment)		Yes	Yes		
Intra-personal competence/Self efficacy	Yes	Yes			
People-centeredness and behavioural change	Yes		Yes	Yes	Yes
Commons management and solution scaling		Yes		Yes	Yes

Many similarities can be drawn between the concept of "low-tech" as popularised by Philip Bihouix and others in France [1] and the appropriate technology movement proposed for developing countries in the 1970's as an alternative to technology transfer of capital-intensive technology from abroad [2]. However, while appropriate technology focused on innovation that are useful, accessible, and durable in the context of developing countries, low-tech is more focused on applications in developed countries. Therefore, to define a competence framework for low-tech, component frameworks of many related concepts were reviewed. We considered competence frameworks in sustainability, human-centred design, social innovation, appropriate technology, and open innovation.

The first and most critical competence framework to our work was that of the EU joint research centre [3] on sustainability education because it considered many of the pre-published competence frameworks for sustainability. The authors considered over 10 well cited competence frameworks. However, this alone was deemed to be insufficient as it left out portions of low-tech that touched on increased accessibility of technologies, and human-centred-ness of the design process.

Having gathered different relevant competence frameworks, it was then important to merge these frameworks into one. One of the immediate challenges was that all the frameworks were not at the same level. The EU JRC, Shift Project, and Quelhas frameworks were all at competence level. However, the social innovation and open innovation frameworks were skills and knowledge level. So, to have a unified framework there was a need to aggregate some of the unique skills and knowledge pieces in the two later frameworks into a coherent competence area.

Suggested additional Reading

[1.] P. Bihouix, L'âge des low tech: vers une civilisation techniquement soutenable. Paris: Éd. du Seuil, 2014.

[2.] A. Akubue, 'Appropriate Technology for Socioeconomic Development in Third World Countries', J. Technol. Stud., vol. 26, no. 1, 2000.

[3.] G. Bianchi, European Commission, and Joint Research Centre, Sustainability competences: a systematic literature review. 2020. Accessed: Apr. 19, 2022. [Online]. Available: https://op.europa.eu/publication/manifestation_identifier/PUB_KJNA30555ENN