



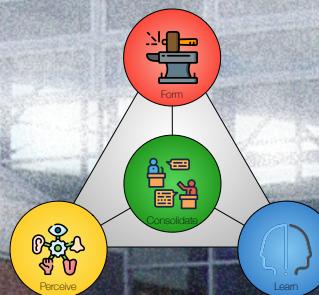
AALBORG UNIVERSITY
DENMARK

1 INTRODUCTION, ROLES AND CORE ACTIVITIES

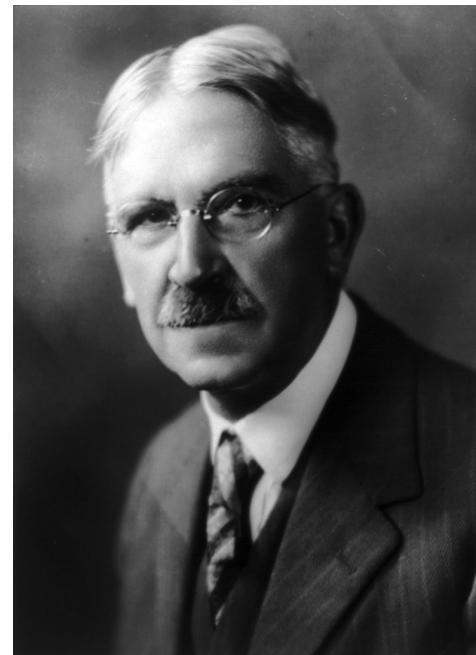
ESSENCE CHAPTER 1

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SWI 2026



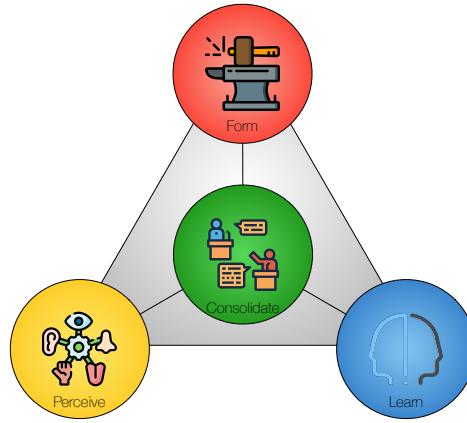
A Disclaimer: This is Not a Creativity Course



We only think when confronted with a problem
– John Dewey (1859-1952)

Agenda

- Exercise 0 Follow-up.
- Digital Innovation.
- Design is Innovation.
- Essence—Made for Design.
- Essence Roles.
- About the Course, Mini-project, and Exam.
- Next Time:
 - Exercise 1: Innovation in Your Project.
 - Lecture 2: Problem-Solution Canvas.



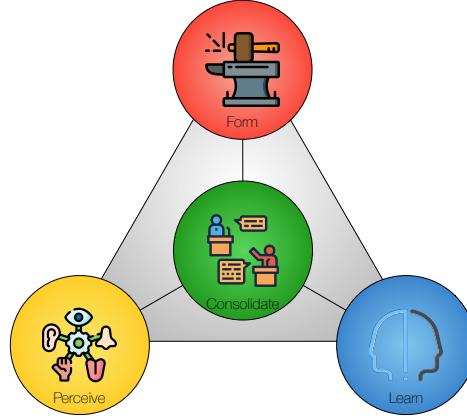
Exercise 0 Follow-up

Exercise 0 (Innovation opportunities)

Exercise 0 is all about innovation opportunities for you this semester.

Look at the semester project description in the study regulations for your education. See if your topic is related to one or more of the following trends and forces:

- Do you see trends in **technology** that might be related to your topic?
- Do you see trends in **legislation, society, culture, and economy** that might be linked to your topic?
- Do you see new **forces** in industry and markets, new **needs** and **demands**, new **products**, and new **conditions** relevant to your topic?
- How can such trends and forces create **innovation opportunities** in your project?



Digital Innovation

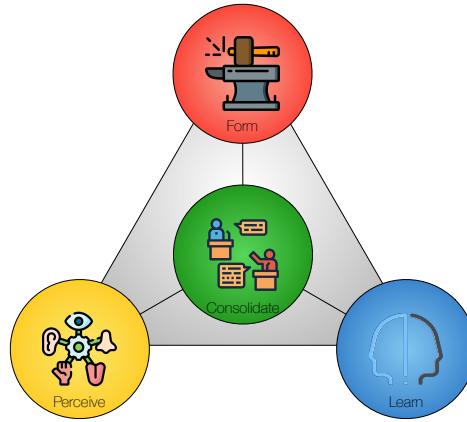
Digital Innovation Defined

Products, services, processes, or business models that emerge within or between business units and where digital technology is a key factor in triggering or enabling value.

Four Types of Digital Innovation

<i>Main definition</i>		Products, services, processes, or business models that emerge within or between business units and where digital technology is a key factor in triggering or enabling value
<i>Variants</i>	<i>Product</i>	New or radically changed products or services
	<i>Process</i>	New or radically improved ways to produce products or services
	<i>Position</i>	Products, services, processes, or business models that emerge by fitting earlier solutions into new uses
	<i>Paradigm</i>	Products, services, processes, or business models that emerge from radical changes in the mental models of what a business is; who the users are; or what the market is

Table 1.1: Four Types of Digital Innovation



Design is Innovation

everyone designs who devises courses of action aimed at changing existing situations into preferred ones

Simon, H. *The Sciences of the Artificial* (1996)

Change is a Constant

- Climate change. Pandemics. Ecosystem collapses.
- Russia's war on Ukraine since Feb 24, 2022.
- Developments since then: Economic crisis (inflation), massive changes in the energy sector, cyberattacks, drones, dual-purpose R&D....
- Hybrid warfare—attacks on critical infrastructure. Prepping.
- Generative LLM systems pass the Turing test. Fake news competes with real news, threatening democracy.
- The 2026 Greenland crisis could signal the end of the post-World War II global order.

We need a Third Paradigm

I.The document-oriented.

- Top-down, static, plan-oriented.

2.The agile.

- Incremental, dynamic, user-oriented.

3.The pragmatic.

- Problem- and solution-oriented.

Factors of Change

- The Anthropocene.
- Knightian uncertainties (and opportunities).
- Hypercomplexity.
- Problems and solutions are interdependent.
- Design takes place in a VUCA world.

Hypercomplexity

Hypercomplexity is a degree of complexity which inhibits or makes impossible rational decision making within reasonable time constraints (Bohman, 1995).

- Systems become increasingly interdependent with open system boundaries.
- Increasingly, digital ecologies emerge while we design.
- New components, sensors, data, platforms, and mobility change the system ecology dynamically.
- Radical increases in what means are available.
- Systems become increasingly intelligent.



Illustration:
Reflection
vs.
Requirements

Problems and Solutions Shape Each Other

- We refer to what we are building as the *Inner Environment*.
 - The Inner Environment denotes the substance and organization of our contributions.
- We refer to what we are building this for as the *Outer Environment*.
 - The Outer Environment denotes the surroundings where our contributions will reside and operate.
- Both environments involve choice.

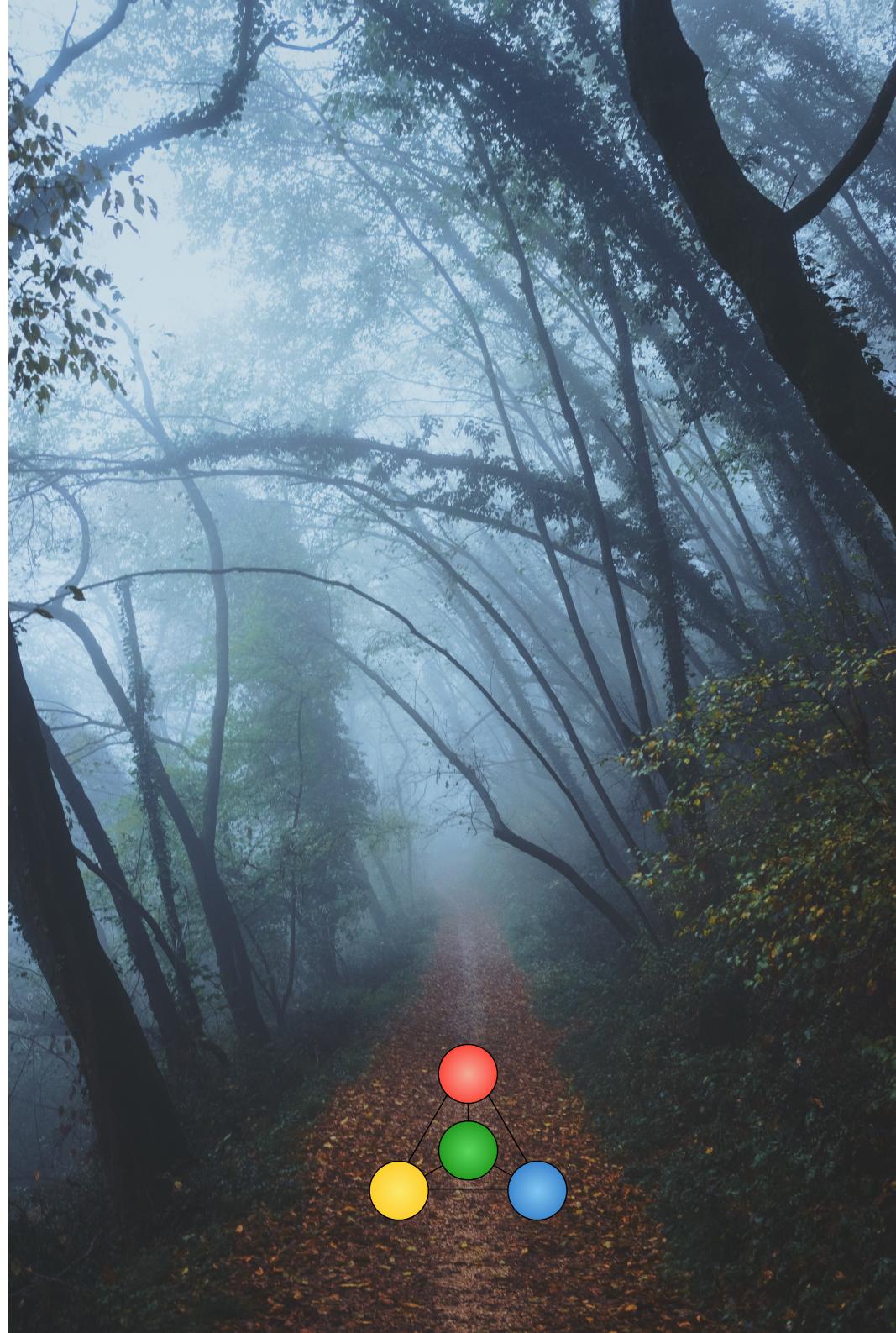
Design Takes Place in a VUCA World

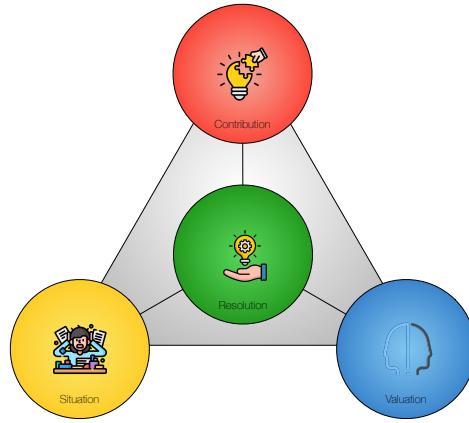
- **Volatility** – i.e., conditions that change rapidly or unpredictably.
- **Uncertainty** – i.e., needs and solutions that are unsettled.
- **Complexity** – i.e., external or internal parts that form intricate meshes.
- **Ambiguity** – i.e., causes and effects that are mixed up.

Working
under such
conditions
is a new
normal

Rocca di Garda, Italy.

Photo by Alessio Lin and published on Unsplash under
the Unsplash license (https://unsplash.com/@lin_alessio).





Essence Made For Design

Visual Inquiry Tools

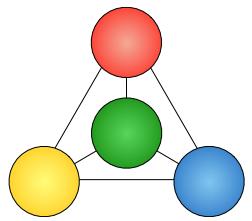
- Visual inquiry tools support joint visual inquiry.
- They support reflection and collaboration among designers.
- They represent complex ideas as a whole, split into parts.
- Separating complex ideas into parts allows for overview and detailed inquiry.

Visual Inquiry Tools

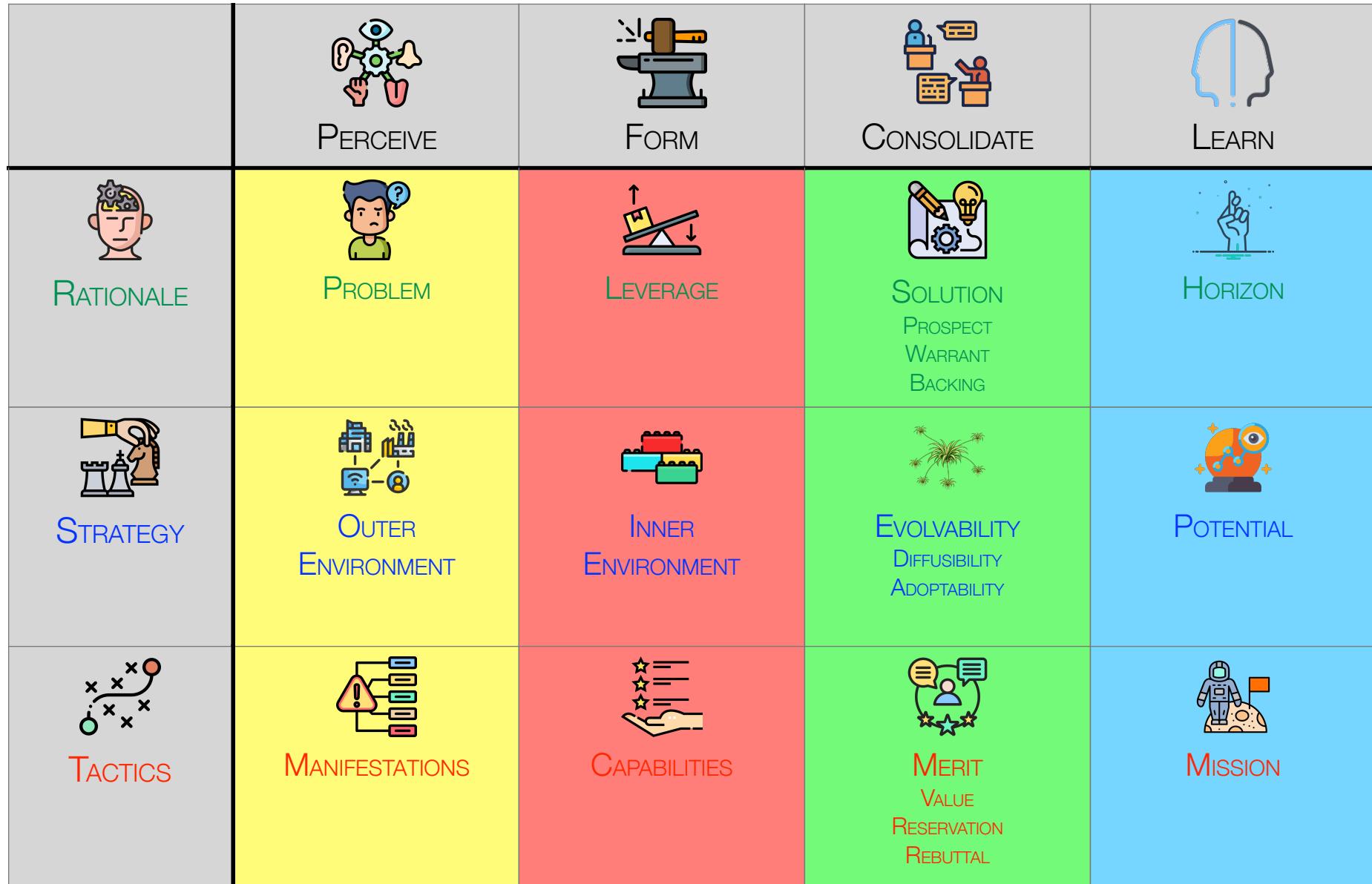
Tools to inquire into specific problems

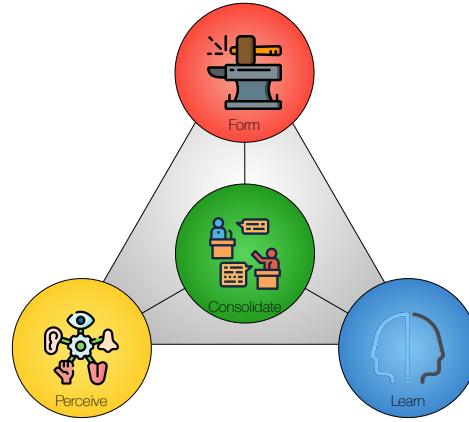
The Business Model Canvas

		Designed for:	Designed by:	Date:	Version:				
Key Partners		Key Activities		Value Propositions		Customer Relationships		Customer Segments	
		Key Resources				Channels			
Cost Structure				Revenue Streams					
<small> This work is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported License. To view a copy of this license, visit: http://creativecommons.org/licenses/by-sa/3.0/ or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA. DESIGNED BY: Strategyzer AG The makers of Business Model Generation and Strategyzer </small>									
Strategyzer strategyzer.com									

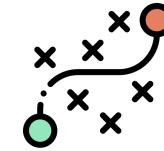


Visual Inquiry Tool: The Problem-Solution Canvas



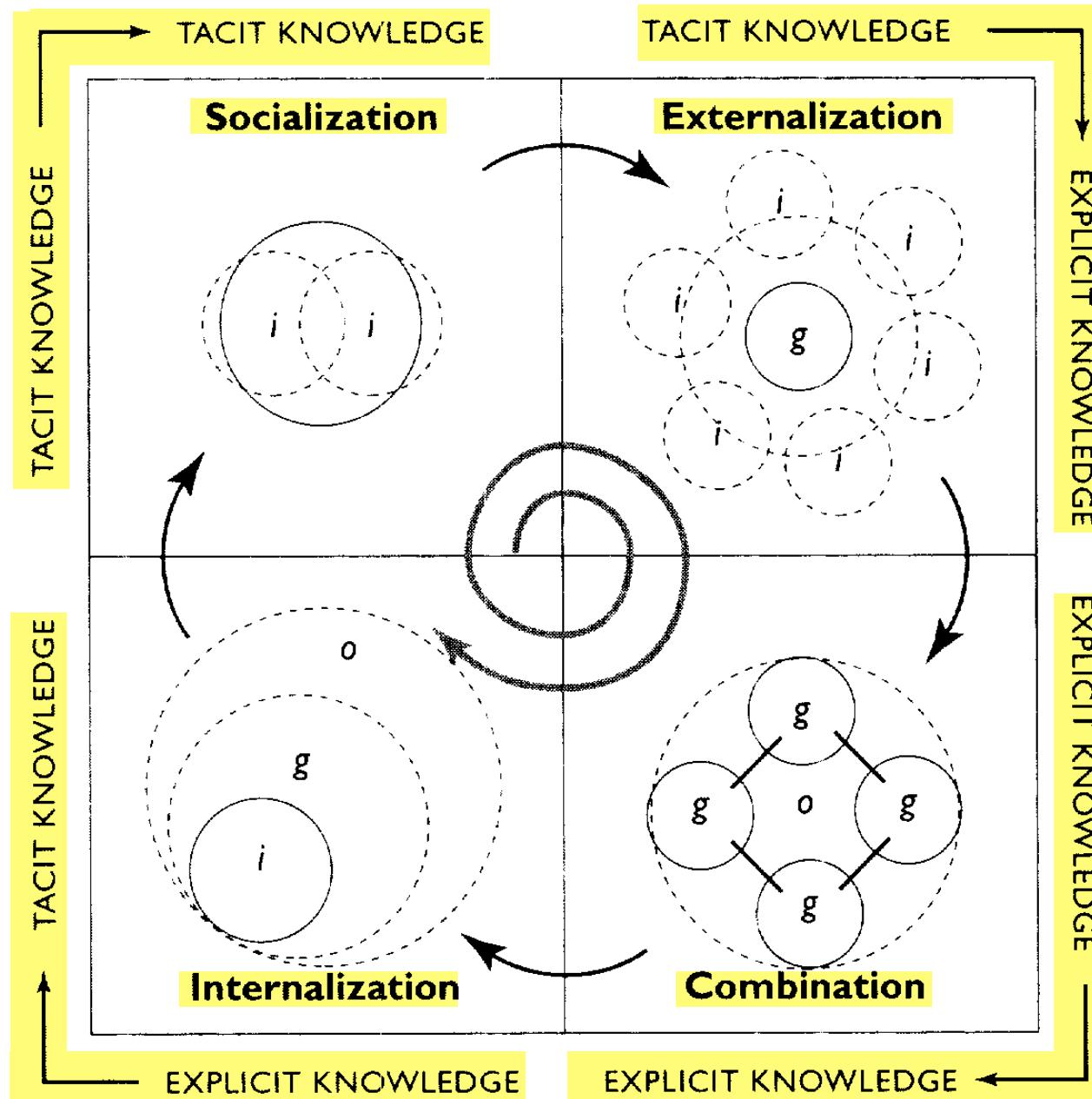


Essence Roles



One who is too insistent on his own views, finds few to agree with him
Lao Tzu (6th century BC–5th century BC)

How do we **create** knowledge?



i: individual
g: group
o: organization

Nonaka, Ikujiro, and Konno, Noboru. "The Concept of 'Ba': Building a Foundation for Knowledge Creation." *California Management Review* 40, no. 3 (1998): 40-55.

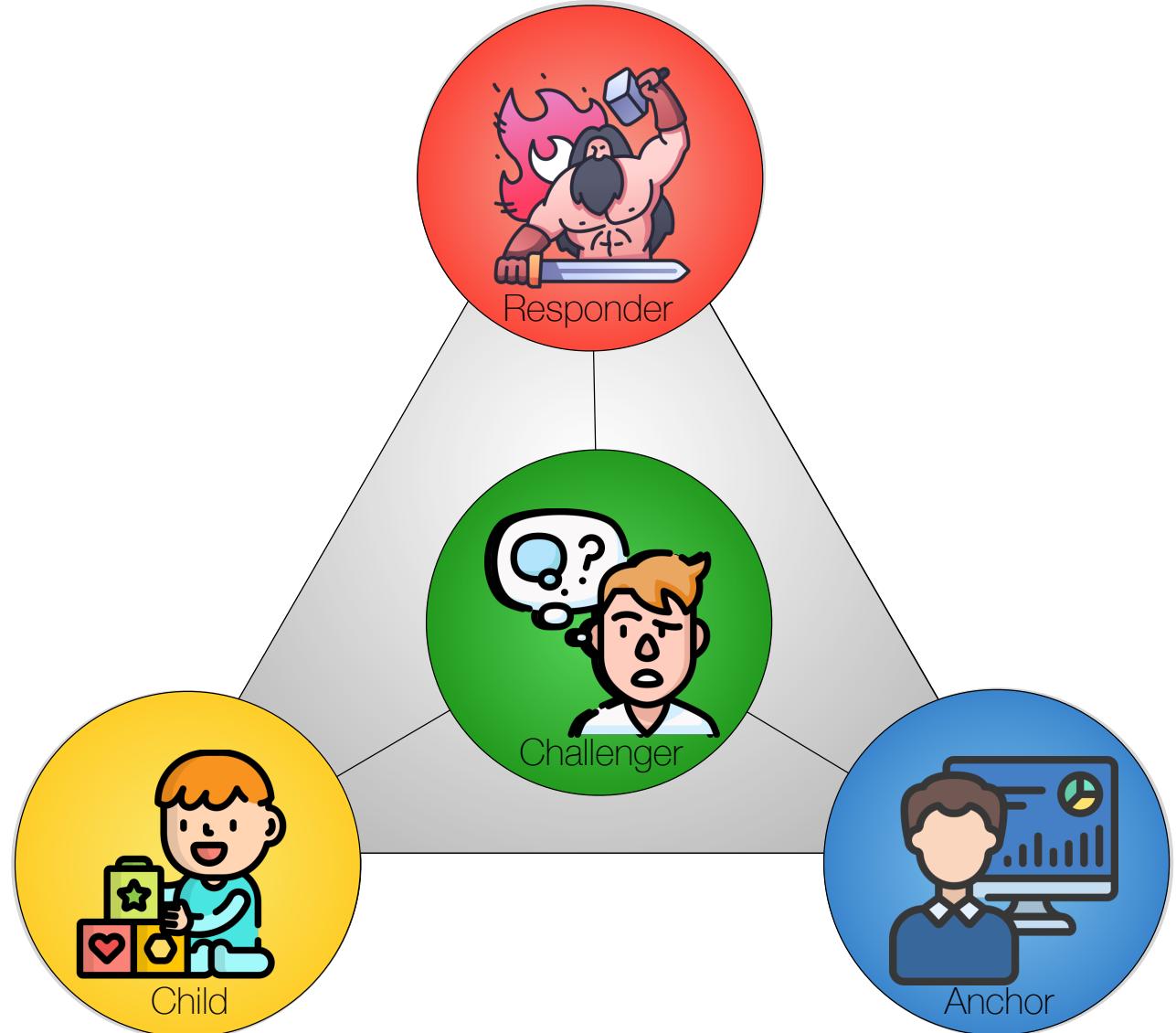
'ba' means a shared space for knowledge creation

Roots: Sanguine – Choleric – Phlegmatic – Melancholic



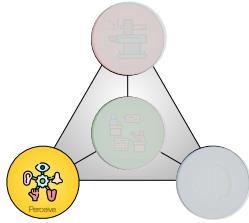
Roles and the Four Core Activities

- *Perceive* – understanding the problem and its context.
- *Form* – designing the constructive parts of a solution.
- *Consolidate* – integrating the design contributions into a clear whole that addresses the situation.
- *Learn* – appraising the design.



Roles are Structural Concepts in Essence

	<i>Child</i>	Any team member exploring the <i>situation</i> . Unorthodox and creative. Offers ideas and proposals without responsibility. Questions conventional views on uses, needs, users, and the application of technology. This Role is fleeting.
	<i>Responder</i>	Any developer working on the <i>contribution</i> . Offers technological responses to challenges—always with a view to technological options and affordances that come up during the design process.
	<i>Challenger</i>	The team member who provides the reasoning and politics underlying the <i>solution</i> . Aiming for a solution with a good balance between problem and contribution in the specific situation. Open to new ideas and good arguments.
	<i>Anchor</i>	The team member in charge of <i>valuation</i> . A team captain (although not a team manager) who facilitates credible evaluations and provides a reasonable basis for decisions on whether to pivot or persevere.

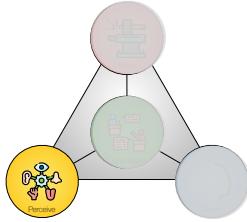


Child



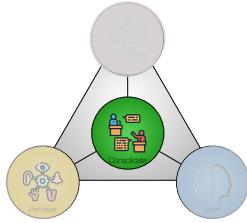
- Can raise **any** question and make propositions **contrary** to previous decisions.
- Is **above** responsibility and critique.
- Is the main **source** of ideas.
- Any person engaging in dialogue about the situation assumes the child role.
- **Outsiders** can also take this role.





Child Contributions

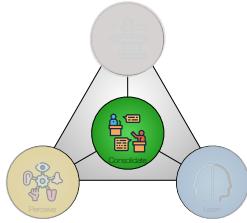
- *Ideation*: Engaging in creative activities and developing alternative ideas.
- *Detailing*: Developing manifestations using, e.g., wireframes, simulations, or improvisations.
- *Evaluation*: Suggesting procedures for assessments or criteria for evaluations.
- *Situation* or *Contribution maturation*: Challenging, widening, or narrowing core assumptions of the project.



Challenger

- Is the **customer or surrogate customer** honoring customer interests.
- Is a main source of **domain knowledge**.
- Formulates and explains the **situation, prioritizes features, and accepts solutions**.
- There may be more than one challenger.

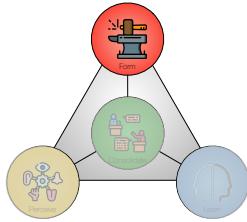




Challenger Contributions



- Be responsible for identifying the **main manifestations** of the problem.
- Engage in idea development.
- Prioritize features and formulate **value propositions** for the customer.
- **Accept** or **reject** contributions.
- State the overall **reasoning** behind the solution offered by the project.

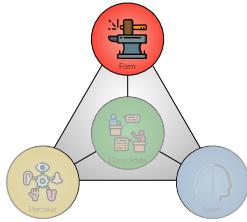


Responders



- Are developers and normally have majority.
- Come up with ambitious responses using their technological expertise.
- Responders and challenger(s) constantly discuss how needs and desires are met.

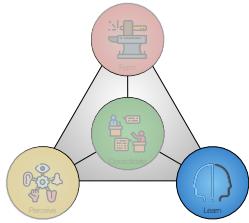




Responder Contributions



- Point to **alternatives** and **options** when building contributions.
- Help **evaluate** strengths, weaknesses, opportunities, and threats.
- Engage in idea development from a **technological** perspective.
- Help evaluate the feasibility and potential of wanted **capabilities**.

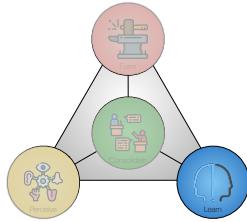


Anchor



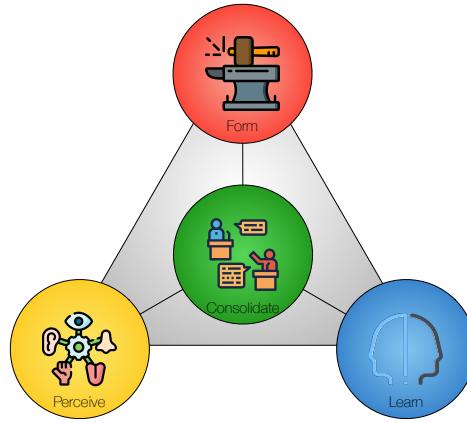
- Is *not* a team leader but is responsible to keeping the team absorbed.
- Leads evaluations but does not decide.
- Intervenes and removes threats to the team.





Anchor Contributions

- Ensure that the team is **functional** and **productive**.
- Suggest and adapt **methods**, **techniques**, and **tools** to support work.
- Ensure **fairness** in evaluations via appropriate methods and criteria.
- Take care of '**foreign affairs**' by representing the project and shielding it from interference.



About the course, mini-project, and exam

Module	Date	8.15 - 10.00	10.15 - 12.00
1	4/2	Exercise 0 (Innovation opportunities) (Innovation opportunities for you in this semester)	Lecture 1 (Introduction, Roles and Core Activities) (Essence Ch. 1 & 2)
2	11/2	Exercise 1 (Innovation in your project) (Type, what, why, how, complexities, uncertainties)	Lecture 2 (The Problem-Solution Canvas) (Essence Ch. 3 & 4)
3	18/2	Exercise 2 (Start on PSC) (Choose Fulcrum and start on PSC)	Lecture 3 (Rationale & Problem) (Essence Ch. 5 & 6)
4	25/2	Exercise 3 (Problem Scenarios) (Develop Problem Scenarios)	Lecture 4 (Leverage) (Essence Ch. 7)
5	4/3	Exercise 4 (Leverage Scenarios) (Develop Leverage Scenarios)	Lecture 5 (Solution) (Essence Ch. 8)
6	11/3	Exercise 5 (Solution Scenarios) (Develop Solution Scenarios)	Lecture 6 (Horizon) (Essence Ch. 9)
7	18/3	Exercise 6 (Horizon) (Develop Horizon and Horizon hypotheses)	Lecture 7 (Strategy & Outer Environment) (Essence Ch. 10 & 11)
8	25/3	Exercise 7 (Outer Environment) (Clarify Outer Environment)	Lecture 8 (Inner Environment) (Essence Ch. 12)
9	8/4	Exercise 8 (Inner Environment) (Clarify Inner Environment)	Lecture 9 (Evolvability) (Essence Ch. 13)
10	15/4	Exercise 9 (Evolvability) (Diffusibility and adoptability)	Lecture 10 (Merit) (Essence Ch. 18)
11	22/4	Exercise 10 (Merit) (Merit and dependencies (ETVX))	Lecture 11 (Team Creativity & General Innovation Theory) (Jackson et al. & Rose)
12	29/4	Exercise 11 (Tool Evaluation) (PSC Tool Evaluation)	Lecture 12 (Innovation as Design Science & Course Overview) (Hevner & Gregor 2022)
13	6/5	Work-module: Finish Mini-project	

Course Literature

- Aaen (draft 2026) + slides.
- Slides with general innovation theory.
 - These slides have references to Rose 2010 (PDF copy of this booklet on Moodle).
- Research papers.

Readings, Slides, Mini-project

- *Readings* will be available in Moodle. Essence chapters will be added when ready.
- *Slides* should be available in Moodle before the lecture starts.
- The *mini-project* is normally based on your semester project.
- Work on the mini-project is scheduled.

Mini-Project

- The exercises are meant to contribute to your semester project **and** the mini-project.
- Contributions: Consistent reasoning, exploration of alternatives, decisions on scope, leverage points, hypotheses about the solution, ...
- Work alone or in groups.
- Technically, the mini-project is not a deliverable and will not be graded.
- The mini-project will be treated as confidential.

See Moodle for detailed and updated description

Why do the mini-project?

- Your semester is about innovation.
- You can use anything from the mini-project in your semester report (no risk of self-plagiarism).
- You can improve your argumentation for the critical choices you make in your project.



Exam (with mini-project)

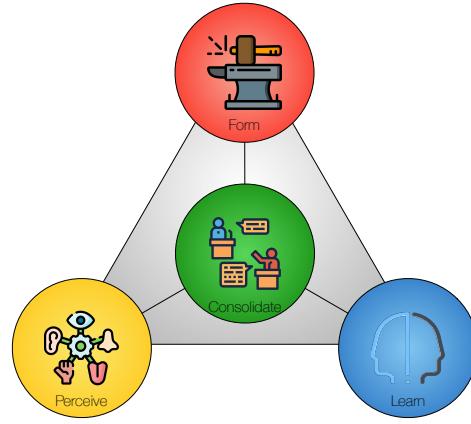
- The mini-project is not graded but serves as a basis for the oral exam.
- You will give a five-minute presentation on the mini-project. Following this, the exam will cover any part of the syllabus.
 - Preferably, the discussion will be related to the mini-project.
- You may use examples and illustrations from the mini-project during the oral exam.

See Moodle for detailed and updated description

Exam (no mini-project)

- You will randomly draw a question related to the topics from the exercises.
 - This list of topics will be updated simultaneously with the exercises.
- You will give a five-minute presentation about the selected topic. The exam will then cover any part of the syllabus.

See Moodle for detailed and updated description



Next Time

Next Exercise and Lecture

- **Exercise 1:**
 - Innovation in your project.
- **Lecture 2:**
 - Chapter 3-4 in Essence: *Problem-Solution Canvas*.

Exercise 1 (Innovation in your project)

Exercise 1 is a follow-up to Exercise 0. In this exercise, we will consider your semester project:

- What **problem** are you working on?
- Explain what **type** of innovation you aim for (Table I.1 in Essence).
- What will be the **keystones** in your design? What will make your design stand out?
- Who will **benefit** from it? What **value** will you create?
- Where will it be **used**? How will it create **change**?
- Characterize your problem or solution challenges in terms of **volatility**, **uncertainty**, **complexity**, and **ambiguity** (Section I.2 in Essence).
- Do you consider your project to be mainly **demand-pull** or **technology-push**? (Section I.2 in Essence)
- Will **roles** be relevant? How? When? What are the **pros** and **cons** of roles?