



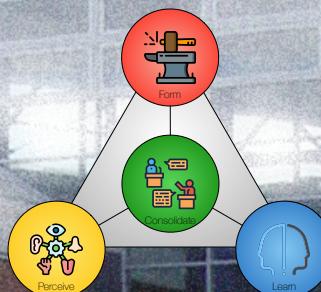
AALBORG UNIVERSITY
DENMARK

3 RATIONALE & PROBLEM

ESSENCE – CHAPTER 5 & 6

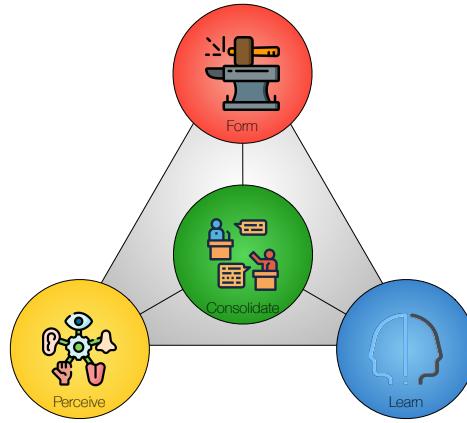
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Agenda

- Exercise 2 Follow-up.
- Chapter 5: Rationale – What We Devise.
 - Deweyan Pragmatism.
- Chapter 6: Problem.
 - Situation.
 - Problems.
 - Problem Scenarios.
- Next time:
 - Exercise 3: Problem Scenarios.
 - Lecture 4: Contribution – Leverage.



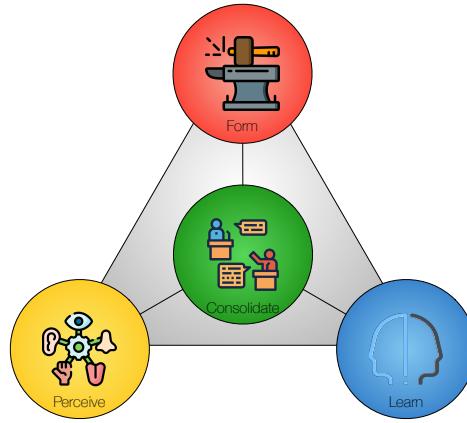
Follow-up: Exercise 2

Exercise 2 (Start on your PSC)

Use the results from **Exercise 1** and the **PSC Template** in this exercise.

Start on the PSC for your project:

- Discuss and choose **Fulcrum** (Sections 4.1 – 4.5). Explain your choice.
- Based on your Fulcrum, broadly outline a **strategy** for your work on the problem and its solution.
- Begin with the **key cells** in the PSC based on your strategy. Keep it concise.



Rationale – What We Devise



Devise: *what we plan or invent through careful thought, what combinations or applications of ideas we form in our minds, and what we intend to obtain or bring about over time.*

Three Levels of Abstraction



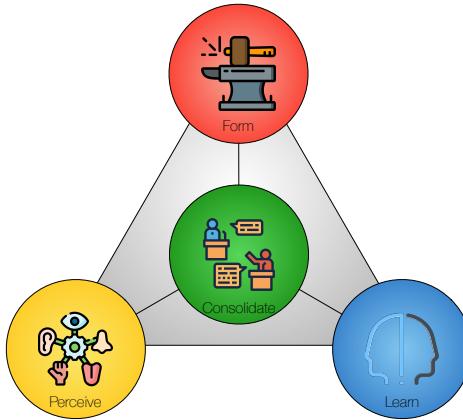
Rationale – the logical basis that makes actions meaningful and helps reason about strategy and tactics for solving the overall problem.



Strategy – the master plan for solving the overall problem, including the scope of the problem, the key components for building the solution, and qualifications regarding limitations and constraints that may affect the utility or acceptability of a solution.



Tactics – actions planned in accordance with the strategy to achieve specific ends.



Deweyan Pragmatism

*the determining of a genuine problem is a progressive inquiry;
the cases in which a problem and its probable solution flash
upon an inquirer are cases where much prior ingestion and
digestion have occurred*

John Dewey (1859-1952)

Pragmatism

Learning by doing

- Practical problems demand creative problem solutions.
- Pragmatic problem-solving is a process of *trial & error*.

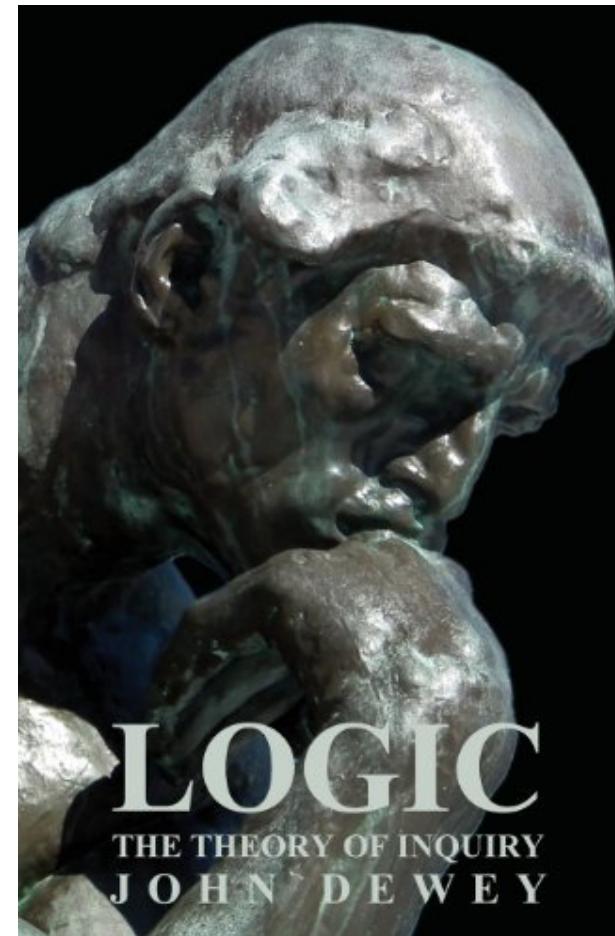
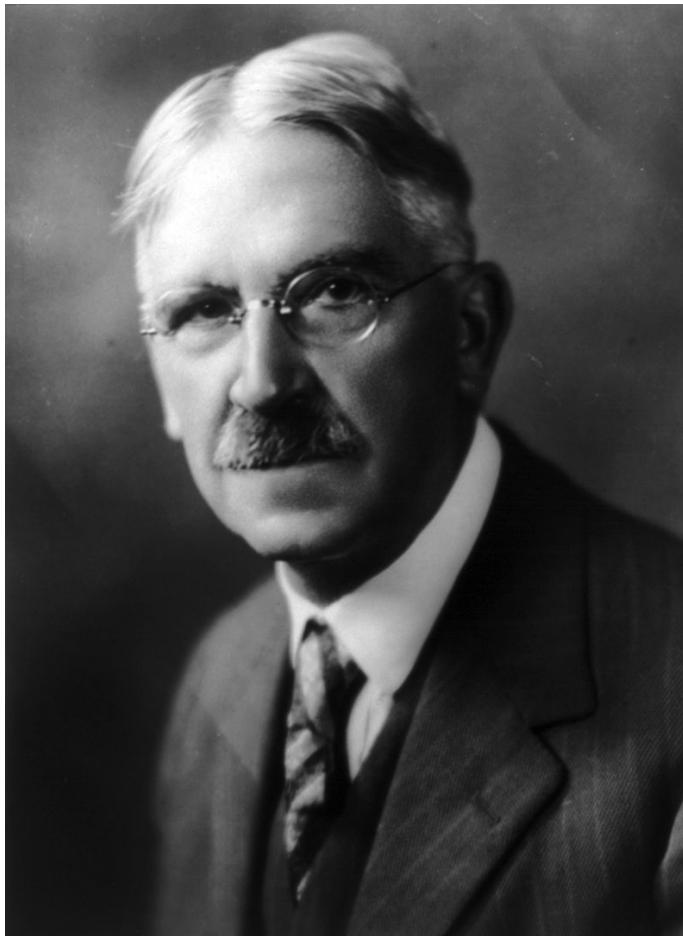
John Dewey (1938): *Logic: The Theory of Inquiry*



The Covered Wagon of the Great Western Migration. 1886 in Loup Valley, Nebraska.

We only think when we are confronted with a problem

Attributed to John Dewey
(1859-1952)

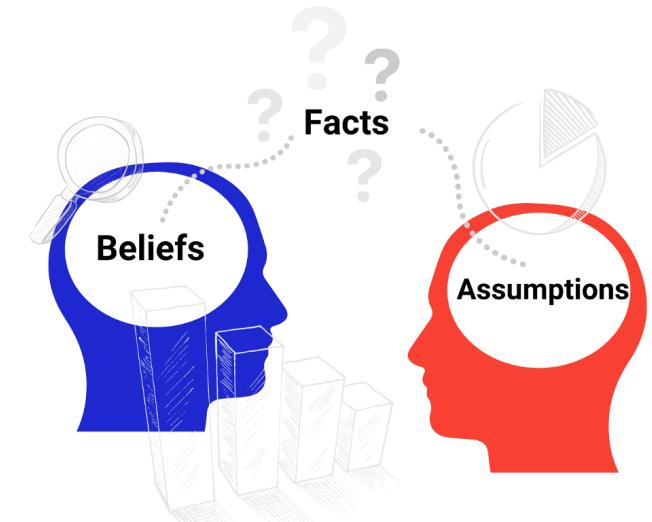


Pragmatism and Problems

What we do is based on our *knowledge* about the situation and our *expectations* of the outcome.

Problem-solving combine two kinds of knowledge:

- *Warranted assertions* that are backed by evidence.
- *Apprehensions* that we grasp because they make sense.



We often consider apprehensions to possess properties similar to warranted assertions

Perception is selective

- *Facts are relevant only by reference to some judgement of value.*
- *Judgements of value are meaningful only in regard to some configuration of fact.*
- *The reality we perceive is selected and structured by our interests and by the standards which our interests generate.*

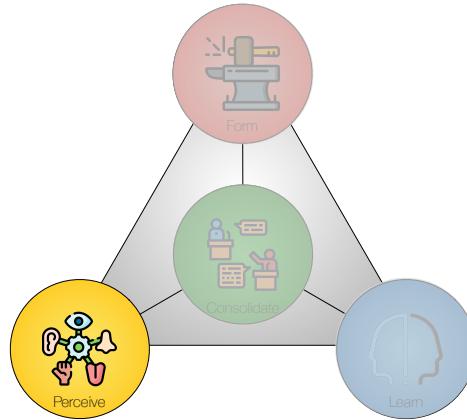
Values and perceptions are inseparable.
We should try to handle our biases.

The Appreciative System

– Seeing and not Seeing

- Our reality system and our value system are largely products of *experience, learning and education.*
- Gradually we build schematas and appreciative systems to select and order impressions.
- Appreciative systems help us recognize and act.
- Appreciative systems can also make us blind.

Appreciative systems may make it hard to perceive or even notice the unfamiliar



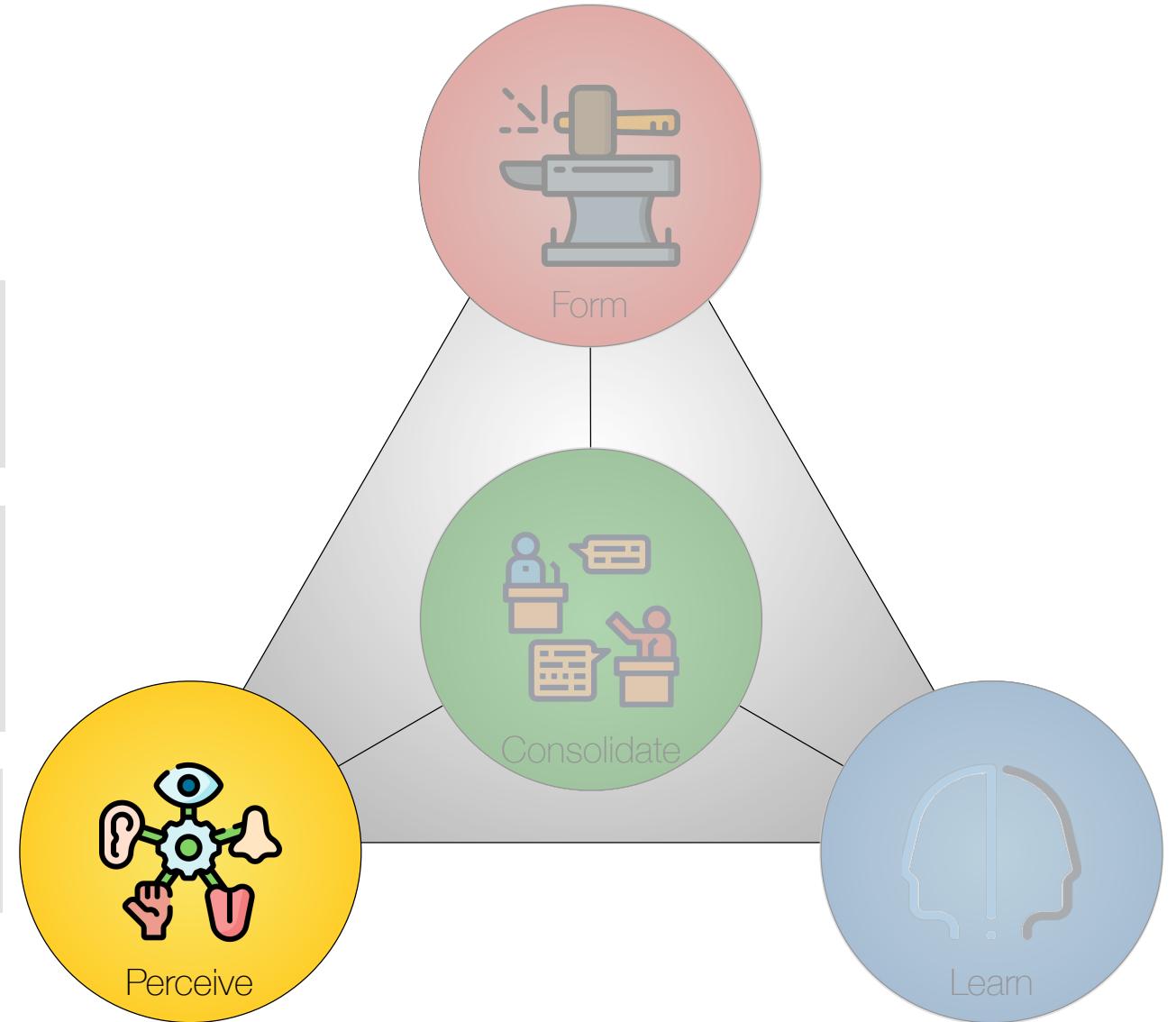
Situation



Things are not always as they seem; the first appearance deceives many.
Phaedrus (15 BC - 50 AD)

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.

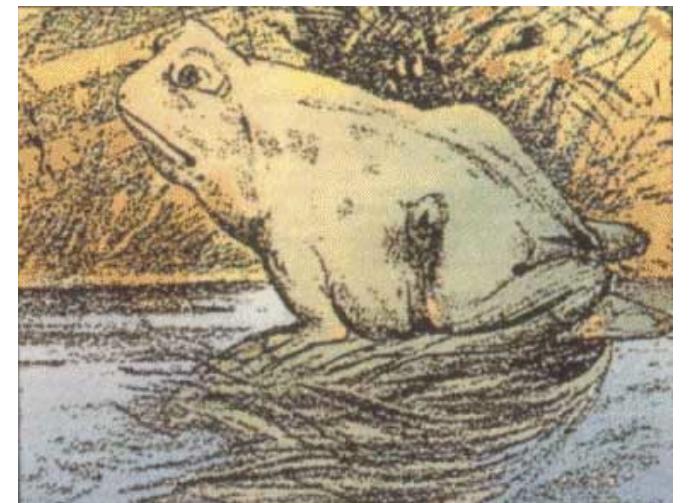


Situation

What is designated by the word "situation" is not a single object or event or set of objects and events. For we never experience nor form judgments about objects and events in isolation, but only in connection with a contextual whole. This latter is what is called a "situation."

This definition introduces a number of concepts in Deweyan pragmatism:

- Object
- Event
- Contextual whole
- Experience
- Judgment (appreciation)



Indeterminate Situation

The original indeterminate situation is not only "open" to inquiry, but it is open in the sense that its constituents do not hang together.

A variety of names serves to characterize indeterminate situations. They are disturbed, troubled, ambiguous, confused, full of conflicting tendencies, obscure, etc.

It is the situation that has these traits. We are doubtful because the situation is inherently doubtful. [...] Consequently, situations that are disturbed and troubled, confused or obscure, cannot be straightened out, cleared up and put in order, by manipulation of our personal states of mind.

Problematic Situation

The indeterminate situation becomes problematic in the very process of being subjected to inquiry.

The indeterminate situation comes into existence from existential causes.

There is nothing intellectual or cognitive in the existence of such situations, although they are the necessary condition of cognitive operations or inquiry.

To see that a situation requires inquiry is the initial step in inquiry.

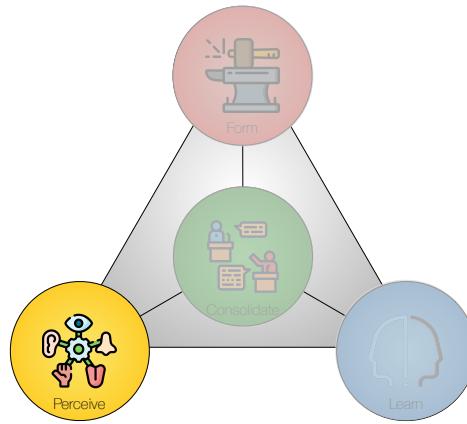
ClusterDetect:

How can we avoid crowds? Where are they? What are the constraints?

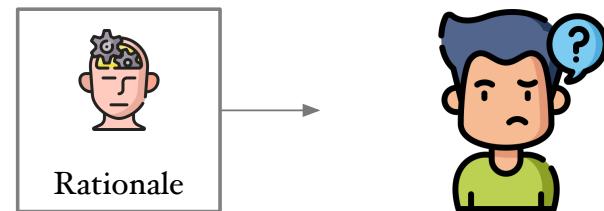
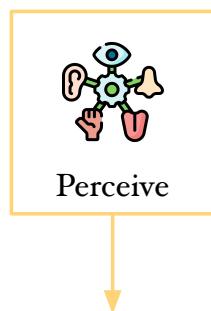
Determinate Situation

The determinate situation is the outcome of the inquiry. This is a situation where our uncertainty and doubtfulness are resolved and replaced by a closed, finished, and unified state:

The determinate situation on the other hand, qua outcome of inquiry, is a closed and, as it were, finished situation or “universe of experience”



Problem



What is a Problem?

- A problem represents the *partial transformation* by *inquiry* of a problematic *situation* into a determinate *situation*.
 - *Situation*: Problems are contextual – conceived in a world of objects and events.
 - *Partial transformation*: Suggests a fleeting quality – problems may replace other problems as our understanding develops.
 - *Inquiry*: Problems are part of an intellectual effort – problems are perceptions that serve as instruments in this effort.

Example: The ClusterDetect Case

- During events at venues we need a system
 - *ClusterDetect* – to help prevent the building of crowds or at least warn users.
- For this purpose, we will need to know where people are and intervene before problems arise.

Illustration I

When an alarm of fire is sounded in a crowded assembly hall, there is much that is indeterminate as regards the activities that may produce a favorable issue. One may get out safely or one may be trampled and burned. The fire is ...

ClusterDetect: Crowding is dangerous. How can we deal with crowds?

Illustration II

... *The fire is characterized, however, by some settled traits. It is, for example, located somewhere. Then the aisles and exits are at fixed places. Since they are settled or determinate in existence, the first step in institution of a problem is to settle them in observation. There are ...*

ClusterDetect: Stages, kiosks, bars, food stands, people, aisles, exits...

Illustration III

.... There are other factors which, while they are not as temporally and spatially fixed, are yet observable constituents; for example, the behavior and movements of other members of the audience. All ...

ClusterDetect: Where are people located? Where are they heading?

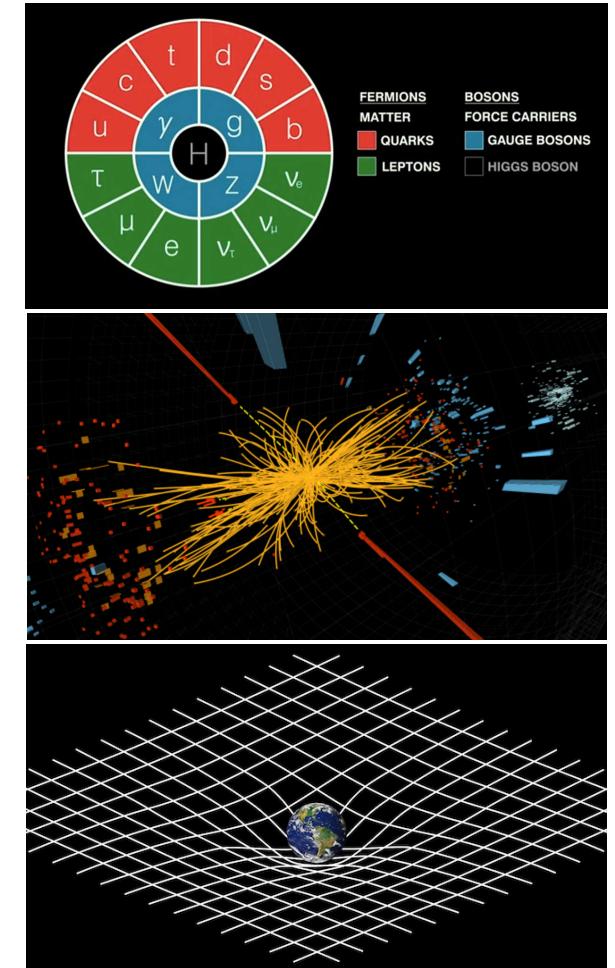
Illustration IV

... All of these observed conditions taken together constitute “the facts of the case.” They constitute the terms of the problem, because they are conditions that must be reckoned with or taken account of in any relevant solution that is proposed.

Perception is both *objective* (things exist) and *subjective* (they make sense to us – given who we are)

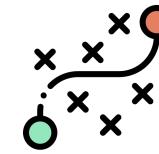
Existential vs. Ideational

- *Existential subject-matter* can interact with and modify other existential subject-matter
 - E.g. components, builds, objects and events.
- *Ideational subject-matter* can explain the situation and suggest what to do
 - E.g. planned components, objects and events, procedures, criteria, ideas.



Higgs Boson and *Gravitational Waves* exemplify ideational subject-matter turned existential

Perception Terminology



Problem



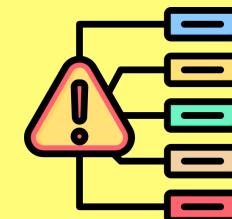
We see a problem as a situation to be handled, where problems appear as manifestations.

Outer Environment



The problem is found in the outer environment. The design is adapted to this domain.

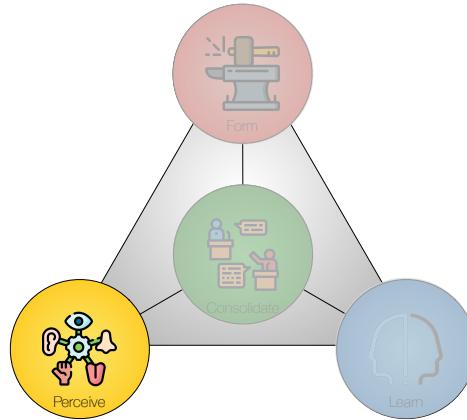
Manifestations



Manifestations are objects, actions, or events that reflect or embody the problem.

Illustration: ClusterDetect

	 PERCEIVE	 FORM	 CONSOLIDATE	 LEARN
RATIO- NALE	 PROBLEM In crowded areas, safety could be compromised	 LEVERAGE Technology: AI [DFNet] Components: [Thermal camera] Information: Problem spots Human resources: [On-the-ground staff]	 SOLUTION PROSPECT ClusterDetect reduces congestion and disruption WARRANT Densely populated areas are common and dangerous BACKING The Contribution is effective and inexpensive	 HORIZON The project creates strengths and opportunities <ul style="list-style-type: none"> - The Problem is understood and generic - The Leverage is future-proof - The Prospect solves the Problem, - The Warrant suggests growth - The Backing suggests motivation to adopt
STRAT- EGY	 OUTER ENVIRONMENT External service: [Access control] Implements: Venue information system Repository: Traffic information People: [Informants]	 INNER ENVIRONMENT Density monitor [Thermal?] Panic and disruption locator General modules for on-the-ground staff and visitors [Customized module for on-the-ground staff]	 EVOLVABILITY DIFFUSIBILITY ClusterDetect is highly specialized and has low diffusibility towards new markets ADOPTABILITY ClusterDetect is limited to the current market, but it can address new needs and thereby strengthen existing market positions	 POTENTIAL The design has strategic potential: <ul style="list-style-type: none"> - Outer Environment is generalized - Inner Environment is near-decomposable - The Qualifications are non-critical
TACTICS	 MANIFESTATIONS Potential crowding Places of congestion Potential starts of panic Potentially disruptive actions	 CAPABILITIES Identify and handle crowds Identify and handle congestion Identify and handle panic Identify and handle disruption	 MERIT VALUE Locates impediments. Finds and handles crowds, congestion, panic, and disruption RESERVATION Requires calibration and clear sight REBUTTAL Many users will accept these limitations in a low-cost system	 MISSION ClusterDetect solves the Problem: <ul style="list-style-type: none"> - The Manifestations are essential - The Capabilities are efficient and effective - The Value offered ensures sustained use



Problem Scenarios



For every complex problem there is an answer that is clear, simple, and wrong
H.L. Mencken (1880-1956)

Four Context Types

CONTEXT	CHARACTERISTICS
<i>Simple</i>	The domain of <i>known knowns</i> . This is where there is a clear relationship between cause and effect. Where this relationship is evident to everyone, and where there is a right answer. In this domain we sense, <i>categorize</i> , and respond.
<i>Complicated</i>	The domain of <i>known unknowns</i> . This is where cause-and-effect relationships are discoverable but not obvious to everyone, and where there might be multiple right answers. In this domain we sense, <i>analyze</i> , and respond.
<i>Complex</i>	The domain of <i>unknown unknowns</i> . This is where we can't know a priori what will work, and where patterns emerge for handling this flux and unpredictability. In this domain, there are many competing ideas and no right answers. Here we <i>probe</i> , sense, and respond.
<i>Chaotic</i>	The domain of <i>unknowables</i> – the domain of Knightian uncertainties. This is where cause-and-effect relationships cannot be determined and where there is high turbulence, high tensions, and limited time. In this domain, we <i>act</i> , sense, and respond. We look for what works to transform from chaos to complexity and then identify emerging patterns.

(Adapted from Snowden and Boone, 2007)

Problem Scenarios

Alternative Interpretations of the Problem

PROBLEM	VERTICAL AXIS
<i>Who</i>	Who is affected? Who are the stakeholders?
<i>Why</i>	Why is this a problem? Why do we do this project? Is it about money, health, convenience, safety, aesthetics, law, social responsibility, ecology, ...?

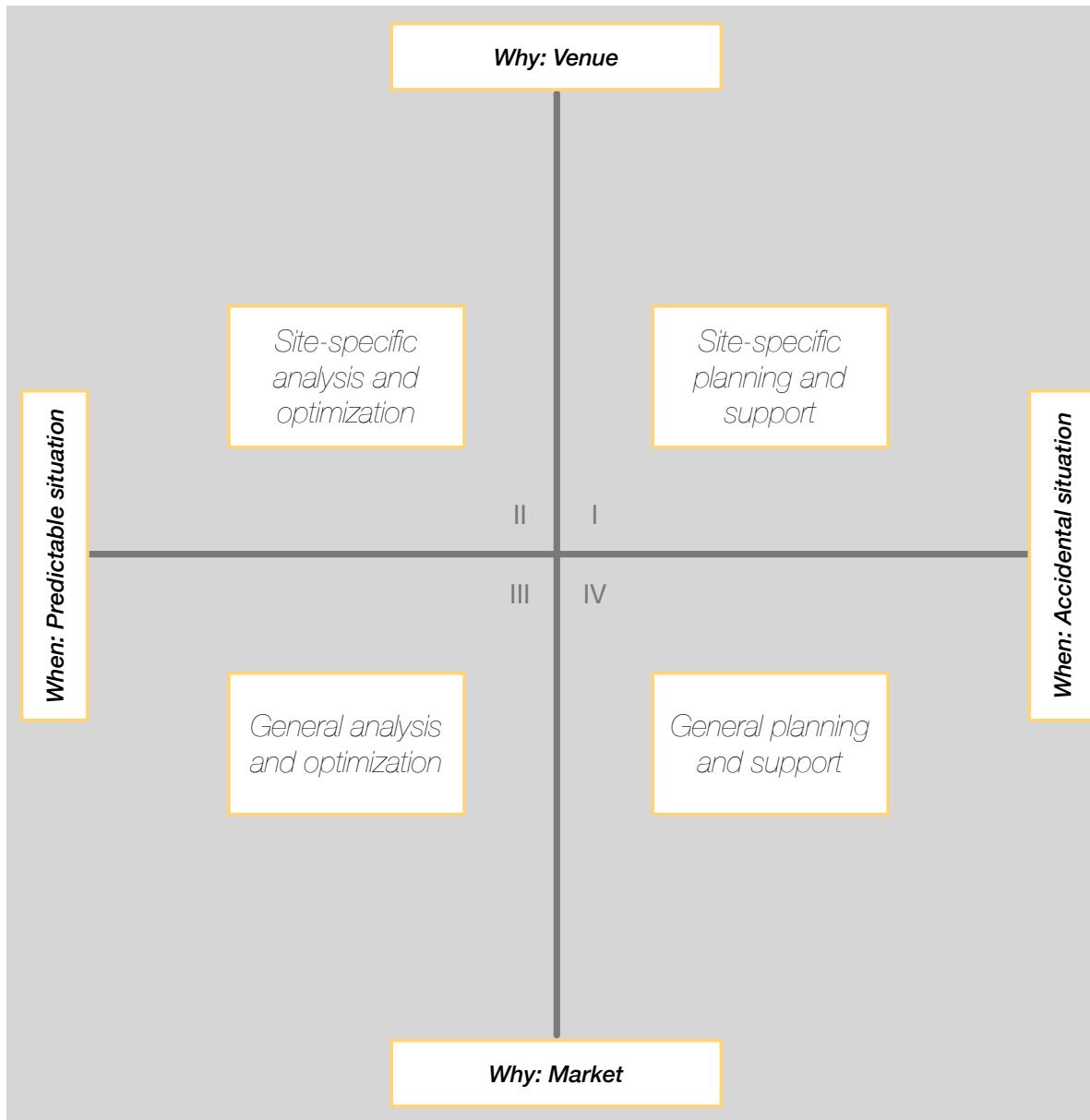
Vertical Axis

Problem Scenarios 2

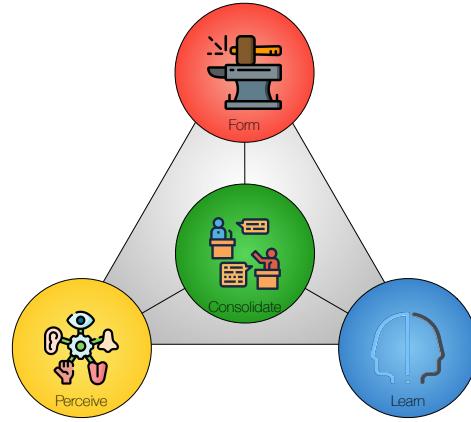
PROBLEM	HORIZONTAL AXIS
<i>What</i>	What type of problem? Is it simple, complicated, complex, or chaotic? (see Table 4.1)
<i>Where</i>	Where do we meet the problem? Where is it located or experienced? Where are those affected by it located?
<i>When</i>	When does the problem occur? Is it constant, occasional, accidental, random, immediate, gradual, delayed, ...?
<i>How</i>	How does the problem cause trouble? Does it affect directly, indirectly, as a network effect, as a side-effect, ...?
<i>How much</i>	How much does the problem bother stakeholders? Can the problem be quantified by what is lost or what could be earned by solving it? Can it be quantified in terms of time, money, manpower, risk, ...? Is it about life, money, or comfort?

Problem Scenarios

ClusterDetect



Example based on one among many alternative axes



Next Time

Next Exercise and Lecture

- **Exercise 3:**
 - Problem Scenarios.
- **Lecture 4:**
 - Chapter 7 in Essence: *Leverage*.

Exercise 3 (Problem Scenarios)

Use the results from [Exercise 2](#) and the [PSC Template](#) in this exercise.

- Describe the [context type](#) of your project as defined in Table 6.1.
- Develop [axes](#) for Problem Scenarios as described in Section 6.3 (Tables 6.2, 6.3, 6.4, and 6.5). Choose two axes for the Problem Scenarios.
- Develop Problem Scenarios as illustrated in Figure 6.1. Explain the problem found in each [quadrant](#).
- [Choose](#) one problem to work with from now on. You can choose one quadrant or combine several if relevant. Express this problem in [one sentence](#) in the PSC problem cell (Section 3.1).
- Outline how this problem [manifests](#) itself in the PSC manifestations cell (Section 3.3).
- Outline the [Outer Environment](#) of your project and enter these elements in the Outer Environment cell (Section 3.2).