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# From Abstract to Artifact: Using LEGO® SERIOUS PLAY® as an Experimental Methodology in Design Science

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## WHAT IS IT ABOUT?

Design Science (DS), according to Romme (2023), focuses 'on solutions as artifacts (…)' (p.4) to solve problems. For conducting DS, a design science cycle can be used, consisting of five phases (Opdenakker and Cuijpers, 2025):

- The first phase is the exploration phase, in which the problem is formulated, as the domain in which the problem is situated.
- The second phase is the synthesis phase. In this phase the design requirements, which define the goals of the solution concept, and initial design principles are formulated.
- The third phase is the creation phase, in which one or more solution concepts to address the problem, are designed.
- The fourth phase is the evaluation phase. Here the solution concept(s) can be evaluated, and the final artefact validated (Pragmatic validation 'Does it work?').
- The fifth phase is the implementation phase. Here, the artefact will be implemented into the problematic context, to solve the problem.

This is an iterative process, resulting in design principles as knowledge outcomes (see Kruse, 2025). In this article we focus on the creation phase, which is often conceived as an abductive "magic" process, or a "black box". For designing solution concepts, an important ingredient is creativity. Lubart (2016) defines creativity as 'the ability to generate new, original ideas that are meaningful and valuable in their context' (p. 7). Creativity can be increased by using several techniques or sources of inspiration, like brainstorming, brainwalking, and Delphi method (Knapp et al., 2023), to name a few. An inspiring experimental methodology that can be used to nurture creativity, problem-solving, co-creation, and team collaboration is LEGO SERIOUS PLAY© (LSP) (Benesova, 2023). This is a hands-on, interactive experimental methodology, where participants use LEGO® bricks to construct three-dimensional metaphors for wicked problems (Jintapitak & Yodmongkol, 2025). LSP consists of four steps – questioning, constructing, sharing and reflecting - as is shown in the LSP cycle (Figure 1). This spiral process allows participants to run multiple rounds, refine models, and generate new insights through reflection.

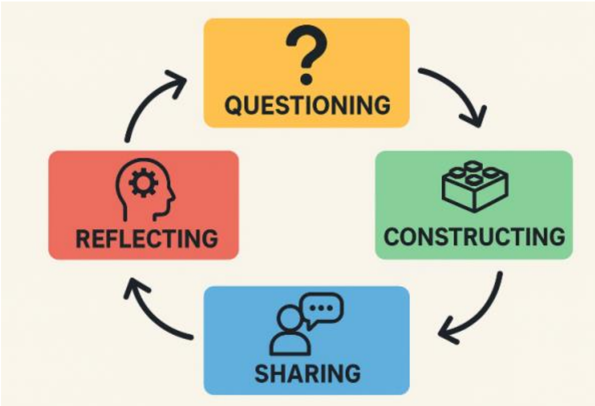


**Fig. 1**. The LSP cycle (Source: Opdenakker and Cuijpers)

## WHAT IS IT GOOD FOR?

LSP is particularly valuable for addressing complex or 'wicked' problems. According to Cripps (2021) wicked problems are problems that seem to be so complex that it is difficult to envision a solution. Wicked problems can be, for example, waste management and plastic pollution, urban housing crises, health inequality or, as in this article, go-to-market strategies. LSP facilitates solution development by, firstly, making tacit knowledge explicit through model-building; secondly, fostering co-creation among diverse stakeholders – common in experimental innovation projects; and thirdly, enabling participants to 'think with their hands', which can unleash creativity. As Boland and Collopy (2004) say, 'thinking is not something done exclusively inside the head but is often accomplished in interaction with other people and with our tools. (…) The more ways of thinking we have available to us, the better our problem-solving outcomes can be' (p. 11).

## HOW TO USE IT

The process of LSP begins with letting the participants, for example a deep-tech venture team, become acquainted with working with the LEGO© bricks for a professional purpose. This is also necessary to immerse the participants in the process as it creates a focus for participants that keeps them 'engaged both in the act of building as well as the ongoing conversation and developing shared ideas' (Warburton, 2025, p. 121). Since the wicked problem has already been formulated in the exploration phase, step 1 of the LSP cycle (posing a question) can be adapted. The facilitator – such as a design scientist – starts with formulating questions, derived from the wicked problem, that encourage metaphorical thinking. They must also create a psychologically safe environment, as play can sometimes feel uncomfortable for adults, and ensure sufficient time for the session, as designing innovative artefacts can be time intensive. In step 2 of the LSP cycle (construction), each member of the team starts building their solution concept, the innovative artifact, for the wicked problem. In step 3 of the LSP cycle (sharing), each member of the team explains his or her solution concept in detail to the team. In step 4 of the LSP cycle (reflection), the group identifies connections between models, discussing whether elements from individual designs should be integrated into a shared final artefact. This process of questioning, constructing, sharing, and reflecting can span multiple rounds, progressing from individual insights to a collective, actionable strategy – as illustrated in the example below.

### Example

A deep-tech start-up is developing a photonic quantum computing chip. They have a prototype, but their go-to-market (GTM) strategy is unclear: should they start with niche high-performance computing customers, license the technology, or target research labs? They use LSP to gain alignment and surface hidden assumptions.

In round 1, the individual perspectives will be brought to the surface. In step 1, posing a question, the facilitator frames the wicked problem as a concrete, open question that invites metaphorical thinking. A question for the deep-tech team to trigger their metaphorical thinking by using LEGO © bricks is "*What does a successful first-market entry for our technology look like?*". In step 2, construction, each participant builds a model representing their vision of a successful GTM launch.

A participant builds a tower of transparent bricks with differently coloured layers, each layer representing a customer segment (for example academia, high-performance computing, AI start-ups).

Another participant constructs a bridge structure using connecting pieces. One side stands for the company (with the product), the other side stands for end customers. Multiple bridges can represent direct sales, online platform, and distributors.

A participant builds two tall structures (company and partner) connected by interlocking bricks or "arms" to symbolize joint ventures, co-marketing agreements, or technical integrations.

In step 3, sharing, each member explains their model, highlighting metaphors. Walls can be a metaphor for barriers, bridges for partnerships, and towers for trust. In step 4, reflection, the facilitator guides the synthesis. The team can identify recurring themes as trust and technical credibility. They also identify differing emphases, as local versus global markets.

In round 2, challenges and barriers will be identified. In step 1, a question for the deep-tech team to trigger their metaphorical thinking by using LEGO © bricks is "*What are the biggest obstacles that could prevent us from reaching this market successfully?*". In step 2, each participant builds a model.

A participant builds a tall, solid wall of stacked bricks blocking a pathway where a minifigure is waiting, representing regulatory approval.

Another participant builds a spindly tower with mismatched bricks, loosely. This represents supply chain fragility.

A participant constructs a maze of walls and dead ends, with a customer minifigure trying to reach the product. This represents customer adoption complexity.

In step 3, each member explains their model, highlighting metaphors. For example, solid bricks stand for strict regulations, or an unstable foundation stands for dependence on a few suppliers. In step 4, the facilitator again guides the synthesis. In this round a clustering of obstacles into categories is made, for example external (regulation, competitor incumbents, adoption lag), and internal (team bandwidth, funding, manufacturing scale-up).

In round 3, building enablers and capabilities will be identified. In step 1, the question is "*What capabilities, partnerships, or actions will help us overcome these obstacles and succeed?*". In step 2, models are built.

A participant builds a bridge of strong interlocking bricks connecting the "company" side (product team) to the "customer" side (a tower or minifigure). This can represent channels, onboarding flows, or customer education programs that connect the company to end users.

Another participant uses flexible LEGO tubes, hinges, or technic pins to link two previously separate models (for example the company and a strategic partner).

A participant reinforces a wobbly tower (supply chain) by adding broad baseplates, cross-bracing beams, or thicker support columns. This represents processes, redundancies, governance, and risk controls that keep the go-to-market plan steady.

In step 3, each member explains their model, highlighting metaphors. The participants describe enablers and link them to round 2 obstacles. For example, flags or guideposts along the bridge stand for marketing campaigns or educational content, or transparent bricks in the connection stand for clarity and trust. In step 4, the facilitator guides the synthesis. Patterns start to emerge. For example, strategic partnerships are critical across multiple barriers.

In round 4, a system model go-to-market strategy is elaborated. In step 1, the question is "*How do these individual elements connect to form our shared go-to-market strategy?*". In step 2 models are built. Participants integrate their models into one collective system model, arranging barriers, enablers, and target market structures into a connected go-to-market “landscape.”. In step 3, the group tells how the system works. For example, “If we secure pilot projects (left side), that creates trust with regulators (center), which accelerates adoption in specific markets (right side).” In step 4, the team reflects on alignment and gaps.

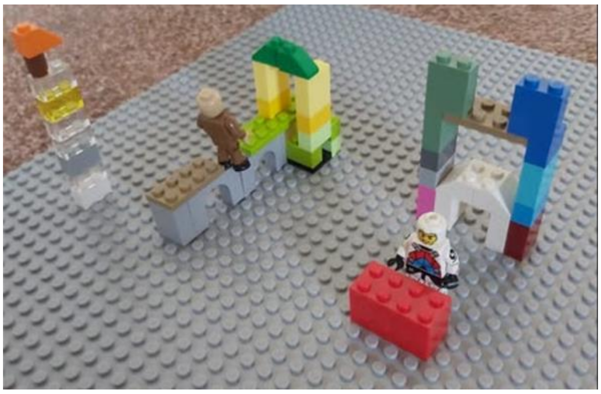

**Fig. 2**. The final shared (metaphorical) 3D model (Opdenakker and Cuijpers, 2025).

The final shared (metaphorical) 3D model (Figure 2) becomes a strategic alignment tool, which can be photographed, annotated, and referenced during board discussions.

At the moment LSP is used across a wide range of professional, educational, and organizational contexts as a facilitation and problem-solving method. Using LSP as a tool in DS can structure and fuel the creation phase in DS projects, a phase that often is a magical "black box”.

## CONFLICT OF INTEREST STATEMENT

None to declare.

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