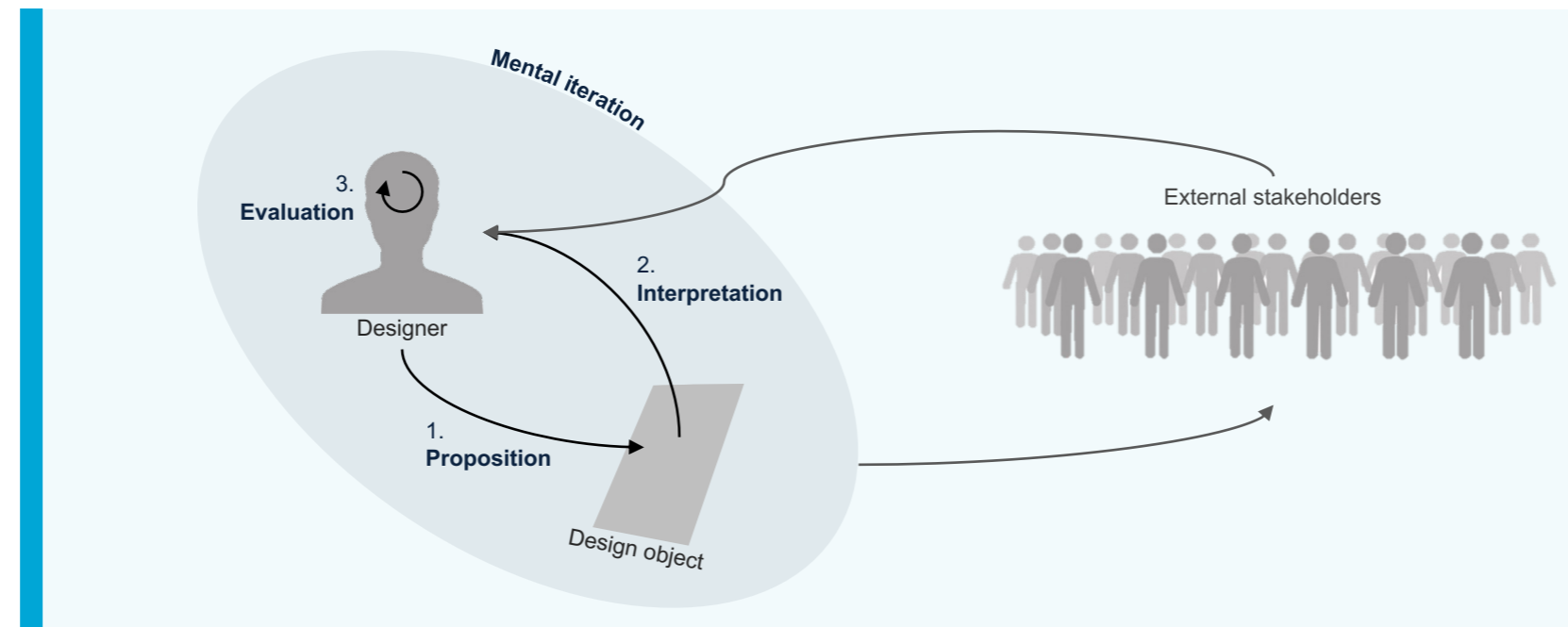


# Amplify your design skills

## Using Large Language Models (LLMs) to augment your design process

### DESIGN PROCESS & AUGMENTATION

#### Mental iterations as fundamental design process building-blocks



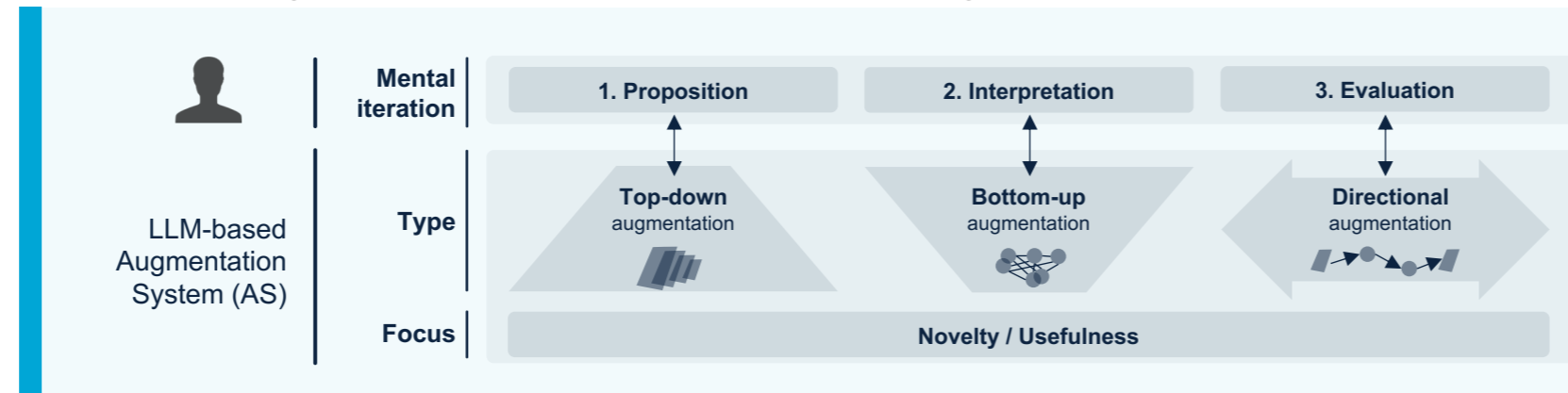
Design is a process of **propositional learning**, where design actions lead to design outputs that represent both unique learning materials for the designer as well as value to a specific set of stakeholders.

After the **interpretation** of such design materials, the designer evaluates on the fit between initial expectation and the real interpretation.

Based on the evaluation outcome, the designer may create a new **proposition** based on his knowledge, expressed via a certain medium, driven by his perceived lack of understanding (perceived uncertainty), and steered by his design, learning, and collaboration goals.

This process of proposition, interpretation and evaluation as captured in a **mental iteration**, forms the fundamental building block for design process progression.

#### Mental iteration stages as basis for six different forms of augmentation



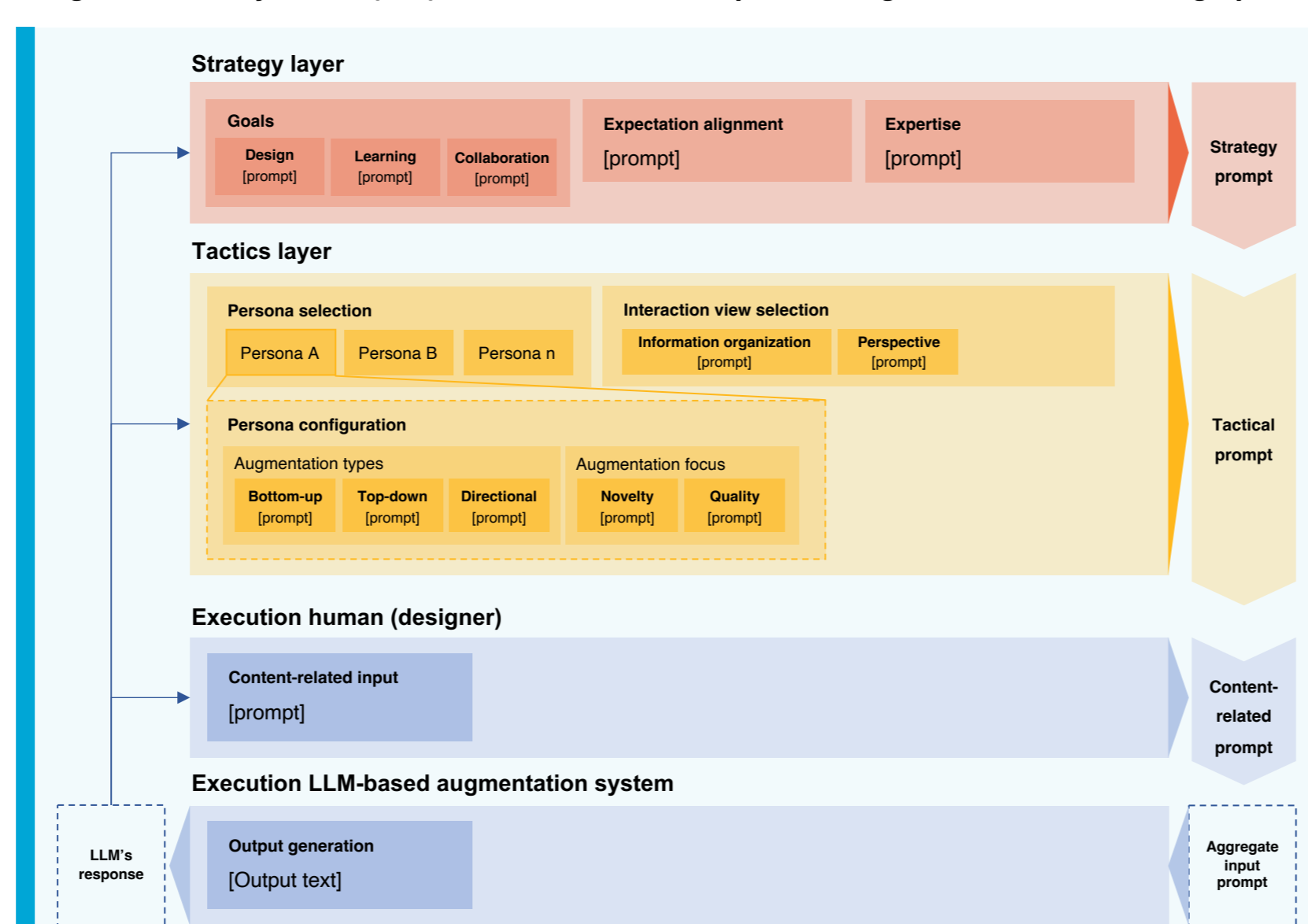
The three stages of a mental iteration also represent the basis for the three **types of design process augmentation**:

- top-down – co-generation of ideas
- bottom-up – provision of relevant information)
- Directional – provision of materials relevant for decisions about the direction of the next mental iteration

The LLM's augmentation action for each stage can focus on enhancing either the **novelty** or the **usefulness** of the designer's actions.

### AN LLM-BASED AUGMENTATION SYSTEM (AS) PROMPT ARCHITECTURE

#### The Augmentation System's (AS') architecture that shapes the augmentation of the design process



#### Conditions and desired direction

It is important that the LLM-based AS and designer are **aligned on the goals, expectations and expertise** to optimally progress through the sequence of mental iterations.

#### Define how to be augmented

The information provided in the strategy layer informs the behavior of the LLM-based AS' personas. **Personas** are an embedded form of the six forms of augmentation, that help to refine the interaction between designer and AS. These personas can be prompted to augment in bottom-up, top-down, or directional ways, with a focus on either novelty or usefulness enhancement.

Besides personas, two **interaction views** mediate the final presentation of the AS' content. 'Information organization' defines the way in which the AS organizes the content, whereas 'perspective' provides a reflection on the already generated content.

#### Taking action

This part is about providing the LLM-based AS with your prompt in which you define what you want it to do. The AS executes that request, taking into account the context provided in the strategy and tactics layers. The AS' output then initiates a new round of interaction that further progresses the design process.

### Research background

#### CONTEXT

- ChatGPT has spurred the interest in trying to understand how to best collaborate with LLMs and other forms of GenAI to increase one's productivity and capacity to learn.
- Besides supporting humans, LLMs are used as a basis for the creation of semi-autonomous agents that execute certain tasks a human would typically do.

#### RELEVANCE

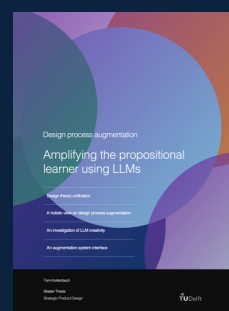
- Depending on the perspective of either an individual or an organization, such LLM-based agents can be regarded as supporting or partially replacing human cognitive work respectively.
- In both scenarios, the technology-based automation of human cognition introduces (to a varying extent) socio-economic considerations about the valuation of human labor, the fit between the educational system and the job market, and the future diversity in human cultures and societies once organized around unified sets of information.
- It is therefore important to understand the current capabilities of (Gen)AI-based systems and their potential to support the human intellect.

#### SCOPE

- This thesis focuses on increasing our understanding of GenAI- and specifically LLM-based design process augmentation to contribute to the broader investigation into hybrid forms of human-AI cognitive work.

#### GAP

- Current design literature is not able to conceptually describe a collaborative process of design process progression which hinders the understanding in the domain of AI-based design process augmentation.
- Besides some empirical observations, there is no theoretically grounded account of an LLM's design augmentation capabilities.



For a more extensive and in-depth coverage of the presented information on this poster, the thesis document can be consulted.