

Scafalle: From Teacher Needs to Design Implications

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Project website Scafalle

Background

Open learning environments such as makerspaces and inquiry-based learning offer rich opportunities for creativity, collaboration, and self-regulated learning, with particular potential for inclusive STEM education (Bosse et al., 2024). At the same time, these formats shift teachers' roles from content delivery to the orchestration of diverse, concurrent student projects, often under constraints related to time, class size, and technical reliability (Kajamaa et al., 2020). Within the DEEP Consortium, the Scafalle project investigates how digital scaffolds can support the sustainable implementation of open learning formats in everyday classroom practice by addressing teachers' orchestration demands and supporting learners' self-regulation.

Research Aim

The Scafalle project aims to design, develop, and iteratively refine a digital tool that supports learners during open learning processes while reducing teachers' orchestration load. The goal is to strengthen learner autonomy without constraining openness or increasing teachers' workload.

Methodology

The project takes a design-based research approach (McKenney & Reeves, 2019), involving qualitative content analysis of focus group interviews, iterative software development and in-class testing and evaluation.

Design-Based Research Logic of Scafalle

Scafalle's design-based research approach: Rather than starting from a predefined technical solution, the app emerged iteratively from teachers' experiences with open learning. Empirical insights from interviews and classroom observations informed design requirements, which were translated into co-designed prototypes and continuously refined through target group testing. The graphic (Fig. 2) illustrates this iterative cycle linking practice, design, and evaluation.

Participatory Design

The wireframe mapping below (Fig. 1) illustrates the challenges in open learning practice and their translation into design implications. Based on a qualitative content analysis of teacher interviews and co-design workshops, recurring teacher needs were identified and translated into design principles and technical requirements. Figure 1 shows how these Needs are mapped onto concrete design implications, demonstrating how insights from classroom experience have directly influenced the development of digital resources.

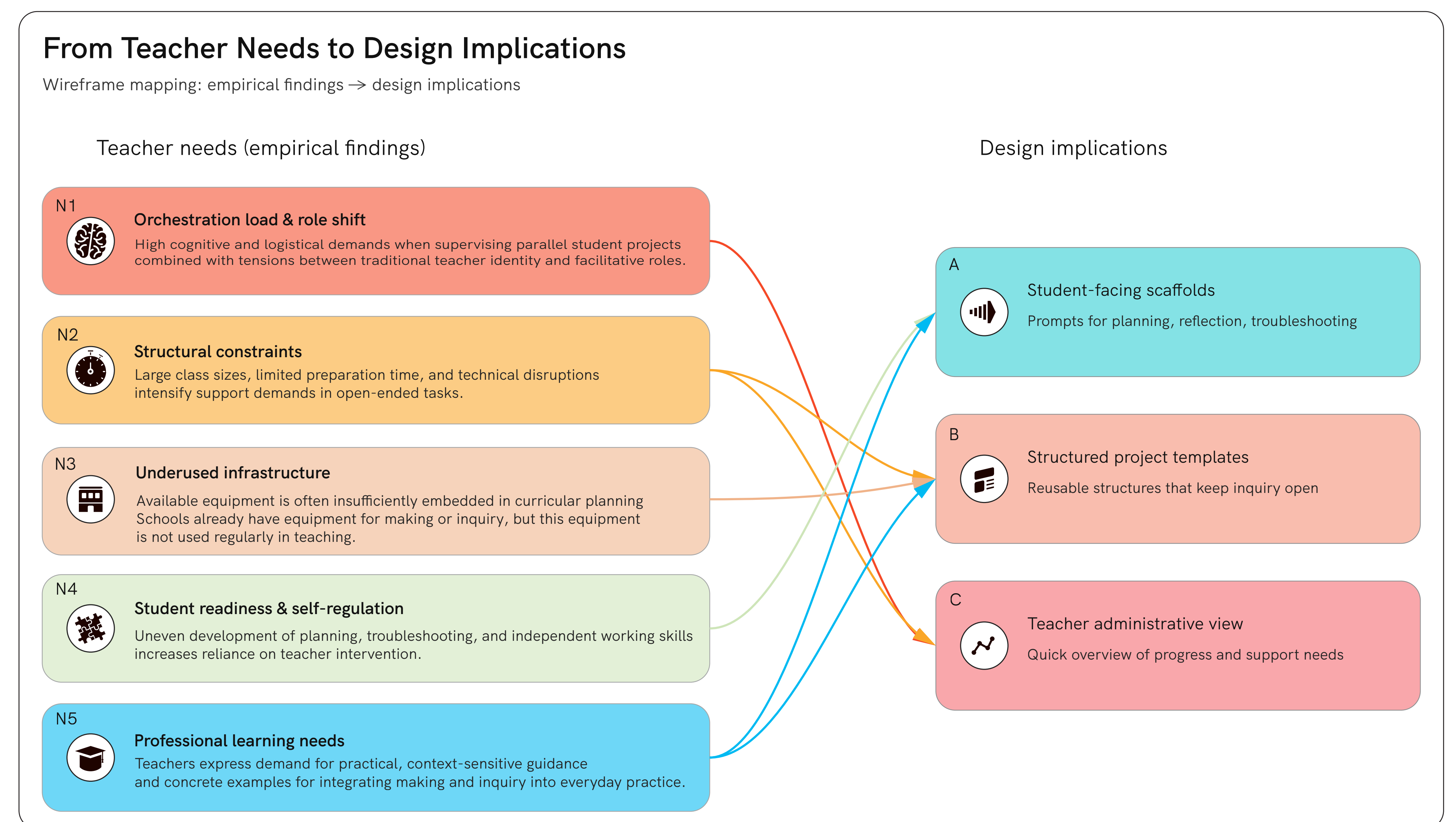


Fig. 1: Empirical needs-design mapping : N1-N5 denote empirically derived teacher needs; A-C denote corresponding design implications implemented in Scafalle.

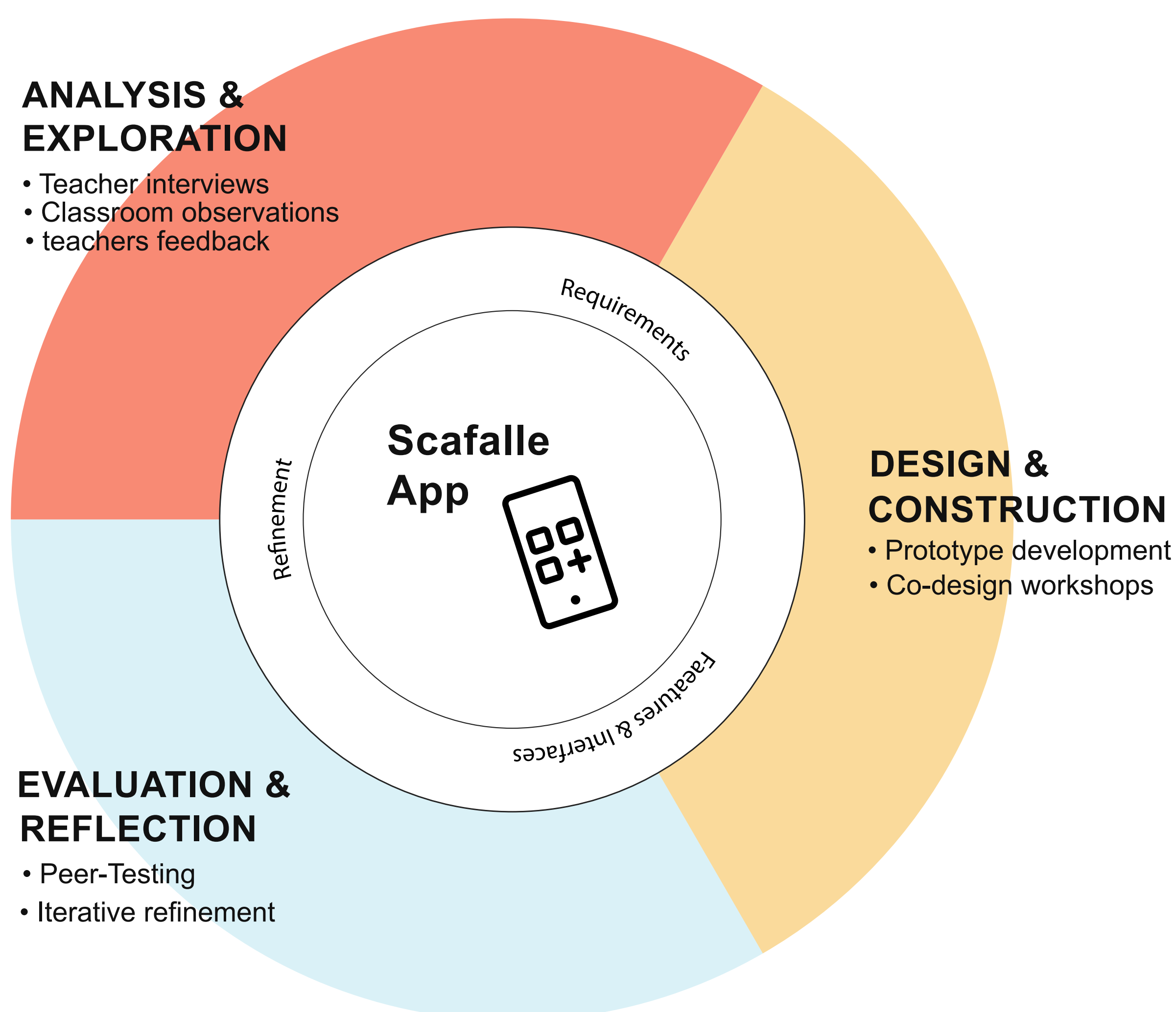


Fig. 2: Adapted design-based research-Cycle (McKenney & Reeves)

The Scafalle App

Scafalle is a modular, scalable web application designed to integrate seamlessly into existing classroom practices.

Core features include:

- Structured project templates that preserve openness
- Digital scaffolds for reflection, documentation, and planning
- Multimodal inputs (text, images, audio) to support diverse learners
- A teacher view enabling progress monitoring across groups and students

The app aims to support learners' autonomy while reducing organizational and cognitive load for teachers.



Outlook

The next project phase focuses on classroom trials in school contexts. Evaluation will be based on qualitative feedback from teachers and will address key dimensions such as usability, pedagogical suitability, classroom applicability, and effects on learners' self-regulation. In the longer term, the project aims to support the sustainable integration of the developed scaffolds into everyday school practice.

References

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