

The Role of Context and Human-Centered Methodology in AI System Design

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The Role of Context

Context is paramount in AI system design, as it ensures that complex technology effectively addresses human needs and functions successfully within the real-world environment. User-Centered Design (UCD) and Human-Centered Design (HCD) are iterative processes where designers must focus on the user and their needs in every phase. The first stage of UCD requires designers to understand the context in which users may utilize a system. This deep focus on context is critical for AI systems for several reasons:

First, context defines the problem space, ensuring the design is useful and not just pretty but useless. Understanding user needs means grasping their context of use, the specific tasks they perform, and the goals they aim to achieve. Without this foundation, designers risk solving their own problems, which may be vastly different from the target users' needs and psychological considerations. For AI tools, which often involve complex logic and automate significant portions of a workflow, designing outside of the specific context of a user's work environment makes the tool highly prone to failure.

Second, context helps mitigate risk, particularly human error and safety concerns. UCD/HCD requires projects to be based on an explicit understanding of the users, tasks, and the environments in which they operate. By tailoring products for people in specific contexts, designers can reduce the chance of situations arising that carry a high risk of human error, leading to safer products. Since AI systems often manage complex, intangible workflows—which represent the most common design context found in Participatory Design (PD) literature—the precision afforded by deep contextual understanding is vital for reliable performance.

Third, methods that prioritize context, such as contextual interviews (or contextual inquiry), are specifically beneficial when researching complex systems or work processes. These methods allow designers to gather information in the moment and context of use, bridging insight gaps from the designer's viewpoint and exposing shortcomings in design considerations. Contextual understanding is the basis upon which designers can form empathy—the essential ability to put oneself in the user's shoes and try to feel what they are feeling. This empathy is crucial for ethical design that respects privacy and the quality of life, especially when designing powerful AI systems.

Finally, the context of use informs the creation of foundational design artifacts like personas and journey maps. These tools, derived from contextual research, help maintain focus on the user's needs throughout the design process. By defining the specific context—such as the operational environment, the challenges faced,

and the user's specific behaviors—designers can move past simple facts (findings) and derive insights that explain user behavior and motivation, offering a path toward possible solutions.

Applying a Human-Centered Process

To create an AI-powered tool for project managers (PMs), the initial “understanding user needs” phase must follow the Research/Understanding stage of the Human-Centered Design (HCD) process. The goal is to explicitly understand the users, their tasks, and their environment.

Chosen Methodologies and Rationale

I would employ a combination of Contextual Interviews, Stakeholder Interviews, and Affinity Mapping for analysis:

- **Contextual Interviews/Observation:** This method is ideal because project progress tracking is a complex work process. Observing PMs interacting with existing systems or manual tracking methods in their actual workplace provides vital insight into the context of use. This helps identify specific pain points and workarounds that a PM might not articulate in a simple conversation.
- **Stakeholder Interviews:** Since project tracking involves coordinating various groups (team members, management, clients), the AI tool's design must account for multiple perspectives. Interviews are necessary to gain a deep understanding of the needs and mutual learning situations required across different stakeholder groups (PMs, team members, management).
- **Affinity Mapping:** This analysis technique is necessary to convert the massive amounts of qualitative data gathered from interviews and observations into actionable themes and insights.

Steps to Understand User Needs

1. **Recruitment and Screening (Equitable Participation):** We must first define and recruit a target PM demographic (e.g., PMs managing specific team sizes or project types). Recruitment must be equitable, ensuring diverse perspectives are included, particularly those most affected by the end result.
2. **Data Collection, Contextual Inquiry:** Conduct the sessions in the PM's real-world work environment. Begin with a one-on-one interview focused on their goals, challenges, and the problems they are currently trying to solve. Follow this by observing the PM using their current tools (e.g., Kanban boards, software dashboards, spreadsheets) to track progress. The PM should be treated as an expert and asked to explain their process to the designer.
3. **Data Collection, Stakeholder Interviews:** Conduct semi-structured interviews with other affected stakeholders (e.g., developers on the team, engineering managers) to understand their perspectives on progress tracking, reporting requirements, and pain points related to the PM's current tracking methods.

4. **Data Organization and Coding:** Transcribe all interviews and organize observation notes. Review the raw data, highlighting interesting statements and assigning objective codes—labels describing what was said (e.g., “manual report generation,” “difficulty tracking dependencies”).
5. **Synthesis and Theming (Affinity Mapping):** Group similar codes onto sticky notes and cluster them into broader themes (e.g., “High latency in progress visibility,” “Friction in cross-functional reporting,” “Need for predictive resource allocation”). This step requires active interpretation to uncover patterns.

Expected Insights

Before designing the system, we would expect to gain several critical insights necessary to inform the AI solution:

- **Definition of Users and Context:** We would define personas and journey maps reflecting the PM’s typical tasks, goals, and emotional high/low points throughout the tracking cycle (e.g., daily standup, weekly reporting, executive summaries).
- **Identification of Pain Points:** We would uncover specific, high-friction areas in the current workflow, especially tasks that take time away from higher-value work. For instance, discovering that PMs must spend an hour synthesizing data across three separate tools, indicating a strong need for AI-driven consolidation.
- **Value Proposition and Requirements:** The synthesis would lead to valuable insights—aspects of user motivation and behavior that hint at a solution (e.g., “PMs require immediate, reliable data to preemptively remove roadblocks, not historical reports”). These insights will define the core requirements of the system.
- **Problem Statements:** Finally, the insights will be translated into concrete problem statements or “How Might We” questions (e.g., “How might we enable PMs to receive predictive alerts about projects falling behind without manual data input?”). These statements serve as the foundational guidance for the subsequent design phase.