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# Designing AI for Human Expertise: Preventing Cognitive Shortcuts *Dobre (2025)*

## Context

Evidence on cognitive load, cognitive offloading and heuristic processing shows humans conserve mental effort by simplifying tasks. AI accelerates this by providing fast, authoritative-sounding outputs. Drawing on Gerlich's (2025) study, which found that heavy AI use significantly reduced critical thinking scores, this practitioner article identifies ten ways AI design can erode human expertise, from cognitive offloading to echo chambers and workforce isolation. It then proposes practical mitigations at the UX and process level, which are mapped against the FORGOOD dimensions by the author of this digest.

## Key Insights

▶ **Below are the main 10 UX risks in AI contexts; for practical mitigations see next page.**

### Shallow user engagement (AI reduces depth of thinking)

- Cognitive offloading: users delegate reasoning, bypassing the repetition needed to build intuition
- Passive thinking: frequent LLM use fosters passivity rather than active knowledge-building
- Speed-driven shallow decisions: rapid output triggers heuristics, prioritising immediacy over quality
- Loss of domain knowledge retention: the "Google effect" extended to higher-order thinking, where users remember where to find information rather than the content itself

### False perceived user expertise (AI inflates perceived competence)

- Perception of AI infallibility: users equate technical complexity with competence, over-trusting outputs
- Dunning-Kruger amplification: surface-level AI-assisted understanding leads to overestimated competence even in complex decision-making
- Impaired expertise recognition: leaders struggle to distinguish genuine expertise from polished AI-assisted outputs

### Narrowed user perspective (AI limits diversity of thinking)

- Reinforcement of cognitive bias: user prompts reflect their own biases, producing confirmation bias loops
- Echo-chamber effect: AI recognises patterns in existing data but cannot suggest novel solutions; iterative data reuse stifles innovation
- Workforce isolation: AI offers instant, judgement-free responses, reducing motivation to collaborate with colleagues

### FORGOOD summary of these risks:

- Unaudited bias (Fairness), hidden AI limitations (Openness) and reduced user autonomy (Respect)
- Degraded or misperceived expertise (Goals), unchallenged echo chambers (Opinions)
- Unconsidered AI-alternatives (Options) and unassessed boundaries of AI vs human expertise (delegation)



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## Dobre (2025)

▶ *\*The FORGOOD mapping reflects the authors' interpretation and is not part of the original source.*

| FORGOOD        | Features  | Explanation   |
|----------------|---|---|
| F - Fairness   | <b>Bias audits &amp; expert oversight</b>                         | Audit the UX as designer for bias manually periodically, consult with subject-matter experts (SMEs) in day-to-day oversight for real-time fine-tuning. Establish quality-review workflows. Embed feedback functions and performance dashboards with oversight, anomaly-tracking and alerts to intervene timely.   |
| O - Openness   | <b>Transparent AI limits disclosure &amp; reminders</b>           | Disclose and regularly remind the user of the AI's confidence levels, training data limitations and capability boundaries. Highlight alternative interpretations & contrasting data.  |
| R - Respect    | <b>Reasoning-first &amp; input-diverse design</b>                 | Design the AI so users input their reasoning before seeing AI suggestions. Enable many input mechanisms (visuals, interactive decision trees) engaging different cognitive pathways. Create immersive simulations and scenario-based training.  |
| G - Goals      | <b>Human-&amp; team-centred incentives</b>                        | Reward human creativity and expertise. Reward collaboration (e.g. with gamified team metrics).  |
| G - Goals      | <b>Guided prompting &amp; train AI on expert user feedback</b>    | AI user interfaces could guide effective prompting development and ask exploratory questions to bridge knowledge gaps. Encourage expert users to provide feedback to refine and inform AI responses.  |
| G - Goals      | <b>Reflection steps, quizzing &amp; AI slows down when needed</b> | Build memory aids and periodic quizzing for active recall. Introduce regular critical-thinking exercises and mandatory review/ reflection steps. Integrate visual representations of uncertainty to slow down decision-making when necessary.   |
| O - Options    | <b>Novelty scoring</b>  | Add an AI-feature scoring how novel a hypothesis or design is by analysing similarity to existing datasets, encouraging innovation and helping mitigate confirmation bias.  |
| O - Options    | <b>Social AI and peer learning</b>                                | Enable mentorship, peer-pairing sessions & cross-functional collaboration in AI-literacy-training and for shared AI usage. Provide social AI features (e.g. to interact, rate and refine AI-content collectively simultaneously).   |
| D - Delegation | <b>Staged rollout by expertise</b>                                | Provide controls to introduce automation gradually (e.g. from junior to senior), allowing expertise to develop as they use AI. Enable manual overrides and require periodic user input to prevent over-reliance on the tool by novice users. Evaluate the sophistication of user engagement with reports to identify skills gaps and inform career-development plans. |

Dobre, J. (2025, February 3). Designing AI for human expertise: Preventing cognitive shortcuts. UXmatters. <https://www.uxmatters.com/mt/archives/2025/02/designing-ai-for-human-expertise-preventing-cognitive-shortcuts.php>;

<sup>1</sup>Gerlich, M. (2025). AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. Societies, 15(1), 6. <https://doi.org/10.3390/soc15010006>