# *Smart Education Stacked Layers for AI-Informed Networked Learning*

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## Intended audience

This workshop is designed for program leaders, instructional specialists, and scholars interested in building a smart education system and exploring critical questions about human-centered design, design justice, and human-in-the-loop approaches in AI-informed networked learning. No special knowledge is required, only a willingness to consider and practice applying smart education stacked layers in the design of AI-informed networked learning environments.

## Workshop description

While learning management systems and data analytics are already a huge part of networked learning, they will continue to evolve as field leaders Thomas Ryberg, Nina Bonderup Dohn, and Maarten de Laat (2025) remind us. This observation is even truer as networked learning systems increasingly incorporate AI and learning becomes necessarily "smarter." In their investigation of layered implications for networked and ubiquitous learning, Jason Tham and Gustav Verhulsdonck (2023) write: "Our motivation for calling attention to 'smart education' in the context of networked learning—understood as modern learning strategies augmented by networked technologies [Jones, 2015]—is driven by the necessity of human-centered design, design justice, and human-in-the-loop perspectives on data use" (p. 87). Informed by such motivation, this workshop begins from the premise that the future of networked learning will be shaped not only by technological capacity, but by the human values and design choices we embed within these systems.

Echoing the sentiments and recent calls-to-action by the Networked Learning Conference community to pay attention to human values in the ecology of learning (e.g., Jensen et al., 2022; Green et al., 2022; Gourlay, 2024; Lee & Citron, 2024), the impetus for this workshop is to explore how smart education systems can be thoughtfully designed by integrating human-centered design, design justice, and human-in-the-loop perspectives. This workshop seeks to ensure that emerging technologies, like AI, augment education and learning, but also remain equitable, empathetic, and responsive to diverse learners.

This workshop will prepare participants to apply the stacked layers framework to design an AI-informed networked learning smart education system. These layers (visualized in Figure 1) include the following:

- Layer 1: Earth (land & people) - *Who are the learners? What is the physical/geographical context?*
- Layer 2: Cloud (data) - *What data is collected, stored, and used?*
- Layer 3: City (space / scope) - *What is the scope and spatial extent of learning?*
- Layer 4: Address (place / location) - *How does location-specific information shape learning?*
- Layer 5: Interface (info display) - *How is information delivered to learners?*
- Layer 6: User (learners & bots) - *Who/what are the actors in the learning system?*



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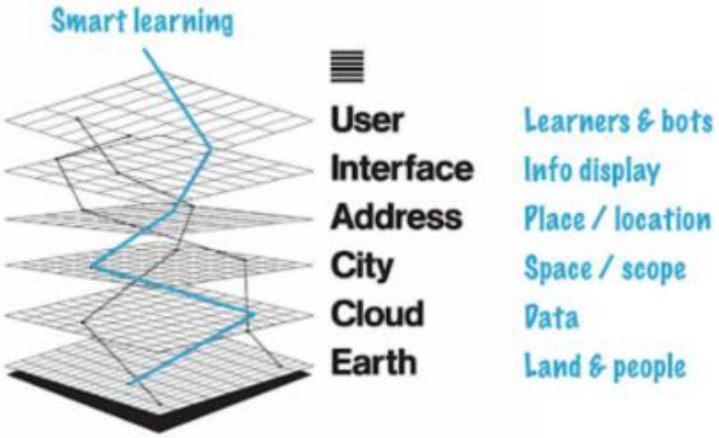


**Figure 1: A "stacked layers" metaphor for smart learning design, adapted by Tham and Verhulsdonck (2023).**

Stemming from smart education and design justice principles (Design Justice Network, 2022), discussions will focus on these critical questions:

1. What technologies or data systems are currently in use or proposed? (e.g., LMS analytics, AI tutoring, IoT sensors, wearables, learning dashboards)
2. How might design justice principles be applied to center community needs rather than technological capabilities?
3. How can we ensure data-informed (not just data-driven) practices that preserve human agency?
4. How can ubiquitous learning respect "socio-cultural-historical contextual relevance of place"?
5. How can we make the presence of smart technologies visible to enhance digital literacy rather than making them "seamless" and invisible?
6. Where should humans stay "in-the-loop" vs. where can automation be beneficial? How do we ensure learner agency?
7. How do we measure the success of a smart networked learning system, and what are the implications for learning outcomes?

Importantly, this workshop will enable participants to design and interrogate networked learning smart education systems that combine AI applications, human-in-the-loop interactions with technology, and design justice principles. Participants will leave with their own map of an AI-informed networked learning smart education system they can use to inform their own institution or organization's evolution of smart*er* education systems.

## Participant engagement

Participants will learn, imagine, analyze, and apply a smart education framework to AI-informed networked learning to create their own smart education system. After an introduction to smart education, participants will map their current or proposed AI-informed networked learning environments (i.e., creating the stack). Then, considering both current realities and other critical questions, participants will work through each layer of the stack to analyze their AI-informed smart learning contexts. In small groups, participants will share analyses and identify where human-centered interventions are most needed. As a large group, participants will identify patterns across their different contexts in terms of challenges at different layers. They will identify how such a "stack" framework can help educators and researchers intervene more critically in smart education design. Most importantly, in this age of AI, they will identify considerations that need to be added to this framework to improve social justice and learning outcomes.

## Participant outcomes

By participating in the workshop, attendees will:

- Understand perspectives of smart education, including interactivity (Jung, 2019), design justice, AI applications and other digital tools, human-versus-AI autonomy, and learning outcomes.
- Critically evaluate layers of design ethics, data practices, roles, and delivery afforded by new AI-informed networked learning infrastructures.
- Identify and analyze layers of "smartness" in AI-informed networked learning.
- Propose a layered "stack" analogy for designing networked and ubiquitous learning.
- Discuss the impact of intelligent delivery and digital twins of learning on networked learning.
- Create a map of their own AI-informed networked learning smart education system.

## Workshop alignment with conference themes

This workshop aligns with the following conference themes:

- **Equity, inclusion, and digital transformation in networked learning:** Participants will create their own AI-informed networked learning smart education system that can be used as a strategic guide to implement smart education systems in their own organizations and institutions.
- **Spaces, places and modalities for networked learning:** Leveraging the Smart Education Stacked Layers for AI-Informed Networked Learning worksheet, participants will identify the places, channels, tools, and modalities (e.g., online, blended, hybrid, boundless) that can be considered as they design their own AI-informed networked learning smart education system.
- **Future of teaching and value-based AI supported networked learning** and **Ethical and responsible innovation and research:** AI is increasingly embedded in our everyday lives, and there is no doubt it will be integral to the future of learning. Participants will be able to share interdisciplinary knowledge and ideate on how to responsibly incorporate AI into networked learning smart education systems (e.g., innovative pedagogies, Human-centered AI, values-driven AI applications, ethical AI integration in education).

## Workshop process & activities

| **Workshop components** | **Time allotted** |
|---|---|
| Introductions<br>● Overview of the workshop leaders and agenda. | 5 mins |
| Overview of smart education in networked learning contexts<br>● We will provide a succinct review of the scholarship in digital literacies, smart education frameworks, networked learning issues, and AI implications to frame the motivation for this workshop. | 15 mins |
| Activity with worksheet; group pairings & sharings<br>● Using a structured activity worksheet, we will prompt participants to map, analyze, and design their localized AI-informed networked learning strategies.<br>● Individually and collaboratively, participants will discuss the critical questions to obtain a deeper understanding of smart education's staked layers for AI-Informed networked learning. | 55 mins |
| Closing & reflections; next steps | 15 mins |

| | |
|---|---|
| • We will use a collaborative (accessible) review tool (e.g., Miro) to facilitate sharing of worksheet outcomes and ideas to spark follow-up conversations as we close the workshop.<br>• Participants will always have access to the board they collaboratively created during the session to continue discussions at their own institutions. | |

## Conclusion

The workshop facilitators bring a breadth and depth of interdisciplinary knowledge about emerging AI technologies, human-centered and design justice, and networked learning theoretical and practical expertise and are able to offer participants a unique participatory approach to designing a stacked layers networked learning smart education system that incorporates AI. The workshop will solicit deep engagement with critical questions, inspire creativity, and empower participants to design and implement the smart education system using their activity worksheet as a strategic guide.

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