From Classroom to Global Stage: Harnessing Deliberation on Wicked Problems in Education

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Introduction: The global classroom and the challenge of wicked problems

The world is awash in ever-growing and interlocking wicked problems. Climate change, habitat destruction, crop failures, mass migration, wars: the list of devilish problems facing humanity, seemingly impossible to solve, is growing exponentially.

Wicked problems can be characterized as being unstructured, cutting across hierarchy and authority structures within and between organizations and policy domains, jurisdictions, and political interests (Weber and Khademian, 2008). Addressing these challenges requires building stronger collective action capabilities to achieve the systemic societal changes needed (Kania and Kramer, 2011). A key enabler of these capabilities is the scaled development and use of collective intelligence technologies oriented toward the common good (Schuler et al, 2018).

Despite the growing abundance of collective intelligence tools, this challenge remains: so many problems, so little time. Stakeholders throughout society are overwhelmed by calls for urgent action across numerous — often literally — burning issues. This constant sense of urgency means that the focus, time and energy are frequently lacking for deep thinking and reflection – crucial for understanding the root causes of wicked problems, coming up with creative solutions, and mobilizing support for the necessary societal course corrections. How can we expand this social dimension of building collective intelligence capacity? A promising way forward lies in bridging the gap between the worlds of collective action and education.

The need for realistic, scalable and impactful deliberation in education

There remains a largely untapped resource: the "global classroom" of students in education, from high schools to vocational training and universities. In universities alone, around 254

million students are enrolled worldwide[1]. Learning goals include developing subject-specific competencies, critical thinking skills, fostering problem-solving abilities and cultivating personal growth and self-reflection. While hands-on research projects, case studies and internships are of the essence for students to develop and hone these skills, many classroom projects rely on rehashed (textbook) cases, lecturers' personal interests, or individual students' pet projects. Currently, professors typically are instrumental in establishing the contacts with external organizations that can bring "real world" experience into the classroom. But what if we could tap into the infinite resource of real-world wicked problems for inspiration?

The common working ground between both education and professional collaboration is deliberation: the careful discussion before decision, or more formally: the thorough dialogical assessment of the reasons for and against a measure before a decision is made (Anastasiou et al., 2023). Whether it is students arguing about the final formulation of their group paper or the IPCC weighing every word in their next global report, deliberation is key. What if we could use this common denominator as the basis for unlocking the vast potential of the global classroom for the common good? What if we could find innovative ways to more effectively mesh individual learning with collective action towards societal change with impact, through carefully designed collaboration and deliberation networks and processes with external stakeholders? Contributing to real world projects for the common good could serve double purposes: on the one hand, it would motivate and engage students, while providing them with superior learning experiences; on the other hand it would unlock a huge thinking and action potential so desperately needed in times of polycrisis.

Electronic support for such interwoven deliberation processes is of the essence, as it can help transcend human cognitive and organizational limitations. Support is needed not just for argumentation itself, but also for interconnecting individual conversations at increasing scales, such as integrating them into collaborative processes and societal agenda setting. Typical ad hoc and inward-looking online community infrastructures – whether educational platforms like Blackboard, the Slack fora used in business, or the random chatter on social media - will not suffice. What we need is a diversity of crowd-scale online deliberation technologies, technologies that allow communities to identify and evaluate possible solutions for problems of shared concern (Klein, 2015).

One rapidly emerging type of crowd-scale online deliberation technologies is generative AI, particularly Large Language Models (LLMs) such as ChatGPT, Claude and Gemini. In the OpenAI funded Deliberation At Scale consortium, we built a prototype application - Common Ground - to experiment with AI-facilitated small group discussions that could be cross-pollinated to increase the scale of deliberations, ideally contributing to collective societal impact. Despite showing promise, this largely tech-driven approach showed significant pitfalls. In particular, meaningfully embedding such scalable AI-guided deliberation processes in their broader societal context proved far from trivial (Deliberation At Scale, 2023).

One rich field that addresses this contextualization issue head on is Community Informatics, which refers not only to the research area but also to the practice of enabling communities

[1] https://www.unesco.org/en/higher-education

with ICTs (Gurstein, 2008). It is a productive field in terms of both theoretically analyzing root causes of socio-technical problems and coming up with practical socio-technical solution directions. One example is the use of socio-technical pattern languages, such as the Liberating Voices pattern language for communication revolution. In Schuler et al. (2020), we explored how such pattern languages might be used to grow impactful community research and action networks to build societal capacity for addressing wicked problems like climate change.

While theoretical and practical ideas on contextualization factors are valuable, they alone cannot make deliberation at scale work. These insights must inform the design of socio-technical deliberation infrastructures which serve two crucial purposes. First, these infrastructures should tap into the scalability potential provided by smart combinations of powerful deliberation supporting technologies. Second, they must be carefully embedded in the educational requirements and constraints of the global classroom, as well as the unruly real-world contexts of the collaboration ecosystems tackling our multitude of wicked problems. Much more than a technical challenge, this is a daunting socio-technical undertaking.

Of course, such a "global-classroom-meets-the-polycrisis-frontlines" socio-technical mesh will not be constructed as a single, mammoth information, communication and collaboration system. Rather, it serves as an organizing idea, that can find a multitude of socio-technical implementations in messy practice – ranging from small to large scale, from informal to well-designed/resourced. The key question is how to identify and analyze the multitude of requirements, limitations, opportunities, and gaps, so that increasingly aligned, more effective socio-technical infrastructures can be conceived, prototyped and implemented from the bottom-up. Such an ecological approach to infrastructure design, experimentation and adoption should have a much better chance of success than yet another top-down, grand educational information systems failure.

Still, this organic approach does not mean we should just muddle along. Carefully identifying socio-technical opportunities and gaps, then designing socio-technical infrastructures tailored to the unique needs of specific collaboratives of educational and wicked problem stakeholders, is of the essence. To this purpose, we propose to repurpose a recently developed online deliberation tool evaluation framework (Anastasiou et al, 2023). We introduce this framework to illustrate how it can provide a conceptual scaffolding needed toward realizing the proposed global classroom vision through deep thinking and comprehensive design.

Building collective intelligence socio-technical infrastructures: an evaluation & design framework

In Anastasiou et al. (2023), we proposed an evaluation framework for transitioning from individually usable to community-useful online deliberation tools. This four-layer socio-technical framework addresses usability, discussion quality, debate quality, and societal context, through the lens of impactful deliberation. By spanning from technical features to societal impact, the framework offers a comprehensive approach to evaluating online deliberation platforms.

The first layer, usability, focuses on how well platform features support individual discussion tasks. The second layer, discussion quality, examines how users make contributions to a

particular discussion and how the platform aids individual sensemaking. The third layer, debate quality, looks at overall content quality and collective sensemaking. Finally, the fourth layer, societal context, evaluates how well the debate process and results align with external societal context and public interests.

For each layer, a (non-exhaustive) set of concrete socio-technical evaluation dimensions were defined. In the usability layer, for instance, *ease of use* and *functionality* are focal points, while in the discussion quality layer, aspects like *summary* and *fact assessment* are key. In the debate quality layer, we move to aspects like *consensus* and *conflict resolution*, while the societal context layer addresses high-level topics, such as *deliberative democracy*, *social justice* and *collective intelligence/impact*.

In the context of this position paper, we slightly shift the focus of the framework. While originally conceived as an evaluation framework, it serves equally well as a design framework, helping to identify and construct socio-technical solutions at different levels of online deliberation support scope, scale and impact. Furthermore, instead of limiting its scope to "community-useful" tools, we propose expanding it to address collective intelligence infrastructures as a whole. This widened scope makes it useful for analyzing deliberation support at the global level – both for classroom settings and wicked problems.

Applying the framework to desiging the global classroom: a scenario

By using the framework's design dimensions, we can create a more contextualized and tailored scalable deliberation process that helps bridge the gap between individual learning and collective action. This approach ensures that the results generated by students are not only academically rigorous but are also practically useful in addressing real-world wicked problems.

To move from abstract concepts to practical application, let us explore how the framework could be implemented in a real-world educational setting. We present the hypothetical "Regreening Your City" scenario to demonstrate how the framework could be used to support the design of global classrooms for tackling wicked problems. The aim of the scenario is to enable students to take on the roles of "public investigators" by collaborating with external stakeholders on various aspects such as research, capacity building, campaigning, and policy formation. Students contribute both the subject expertise they acquire in their studies and their growing critical thinking skills. During the scaled deliberation process, students engage with real-world stakeholders who assume roles such as problem owners, informants, and evaluators. Through this interaction, they collectively co-create solutions that are aligned, interconnected and impactful.

Examples of socio-technical interventions at the various layers could include ***role-based dashboards*** (*usability* | *ease of use*) that provide intuitive access to relevant tools and information depending on the roles students and external stakeholders play (e.g. urban planner, environmental scientist, community liaison). These dashboards would help students develop project management skills, while also facilitating efficient collaboration among diverse problem stakeholders in regreening efforts. Another example could be ***evolving regreening debate synopsis*** (*debate quality* | *synopsis*). This could take the form of an AI-generated, continually updated summary of the overall regreening debate, including main arguments, evidence and proposed solutions. This synopsis could help students enhance their

holistic thinking and systems analysis skills, while serving as a common action agenda reference point for all regreening problem stakeholders.

Space does not permit providing more detailed explanations here, but Appendix 1 and 2 give further examples of socio-technical interventions across the layers of the framework, and their contributions to both student skill development and collective action/impact.

Conclusion: nurturing complex collaborative problem-solving skills in a troubled but connected world

Humanity is plagued by an ever-expanding mesh/mess of wicked problems. Addressing these challenges will require an all-hands-on-deck approach to build the necessary collective intelligence capacity. The global classroom may come to the rescue. By engaging students in contributing their collective intelligence and co-creating solutions with external problem owners, they can acquire valuable competencies and expertise, while simultaneously strengthening collaborative capacity for addressing wicked problems around the world.

Scalable deliberation support, such as online deliberation tools combined with (generative) AI, offers great technological potential to build that capacity. However, to develop usable, useful, and impactful socio-technical deliberation infrastructures, we need careful holistic evaluation and design approaches. We adapted an existing evaluation framework for online deliberation tools and applied it to the construction of collective intelligence infrastructures for joint educational-wicked problem collective action settings. We illustrated this approach with an example relevant to climate action.

We have presented only some preliminary ideas of how a framework for designing socio-technical infrastructures for collective intelligence could be used. We do not claim this to be THE definitive framework. Rather, in our thought experiment, we used it as an illustrative example of a class of such frameworks. Our intent was to demonstrate that employing such frameworks can be valuable in developing increasingly scaled and interconnected socio-technical infrastructures to address wicked problems. Acknowledging their limitations, we believe such conceptual lenses may help unlock, direct, and better utilize the remarkable potential of ever more powerful (AI-driven) deliberation tools, ensuring that they augment rather than overpower human capabilities.

While our proposed framework for designing collective intelligence infrastructures is still in its infancy, it represents a crucial first step. By offering this design perspective, we aim to catalyze the development, alignment and putting to common good use of more effective, ethical, and empowering (AI-driven) deliberation tools. Our vision is to unlock the full potential of these technologies, harnessing them to augment human collective capabilities rather than overpower them. Providing students with hands on collaborative problem-solving skills vital for addressing the world's most pressing challenges not only enhances their educational experiences, but also transforms the global classroom into a catalyst for worldwide collective action.

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Appendix 1 The Regreening Your City scenario: examples of socio-technical interventions

Framework Layer	CI Dimension	Socio-Technical Intervention
Usability	Ease of use	Role-based dashboard
Usability	Functionality	Urban regreening toolset
Discussion quality	Visual aids	Interactive green space maps
Discussion quality	Summarizing	AI-powered discussion summaries
Debate quality	Synopsis	Evolving regreening debate synopsis
Debate quality	Key points	Controversial points highlighter
Societal context	Citizen engagement	Inclusive participation mechanisms
Societal context	Collective intelligence	Expertise aggregation tools

Appendix 2: The Regreening Your City scenario: examples of student skills development/collective action contributions of interventions

Socio-Technical Intervention	Student Skill Development	Collective Action Contribution
Role-based dashboard	Project management, stakeholder communication	Efficient collaboration among diverse actors
Urban regreening toolset	Technical skills in urban planning and environmental science	Evidence-based decision-making in regreening efforts
Interactive green space maps	Data visualization, spatial analysis	Enhanced understanding of urban green infrastructure
AI-powered discussion summaries	Critical analysis, information synthesis	Rapid knowledge sharing across stakeholder groups
Evolving regreening debate synopsis	Holistic thinking, systems analysis	Shared understanding of complex regreening challenges
Controversial points highlighter	Argument analysis, conflict resolution	Identification of key areas for negotiation and compromise
Inclusive participation mechanisms	Community engagement, participatory design	Increased public support for regreening initiatives
Expertise aggregation tools	Interdisciplinary collaboration, knowledge integration	Comprehensive, multi-perspective regreening strategies