

Future-Ready Society Conference 2024: Learning Journey 4 — How to Design Systems that Harness Collective Intelligence

By Dolphie Bou

The Future-Ready Society Conference Series

The Future-Ready Society Conference Series is a partnership between the Institute of Policy Studies (IPS), Lee Kuan Yew Centre for Innovative Cities (LKYCIC) and Tote Board. As part of this series, learning journeys serve to introduce novel ideas to spark dialogue across the people, private and public sectors. These discussions are a prelude to the annual flagship Future-Ready Society conference, which aims to explore future trends, emerging issues and untapped opportunities along with insightful responses and solutions to address pressing societal challenges.

The fourth learning journey, titled “How to Design Systems that Harness Collective Intelligence”, took place on 10 September 2024 and was moderated by Dr Dilum Wewalaarachchi, Research Fellow at IPS. The event featured Mr Robert Laubacher, Executive Director and Research Scientist at Massachusetts Institute of Technology’s (MIT) Center for Collective Intelligence, who delivered a presentation on “collective intelligence” (CI) as a crucial tool for enhancing citizen participation and addressing complex social issues. Two distinguished local discussants then weighed in on the practical applications and ethical considerations of such innovations before the question-and-answer segment.

Using Supermind Design and Generative AI to Address Complex Challenges

Mr Laubacher opened the session by introducing the concept of CI, using Professor Thomas W. Malone’s definition from [Superminds](#) (2018): “groups of individuals acting together in ways that seem intelligent.” He acknowledged the controversies around this definition, particularly in how it has been politically misused to claim some groups are more intelligent than others. Despite these controversies, he emphasised the core idea: CI is the ability of a group to achieve a desired goal, often characterised by adaptiveness and resilience.

Mr Laubacher illustrated this concept with examples from the animal kingdom. Bees, ants and wolves, for example, all demonstrate intelligent collective behaviour, where relatively simple interactions between individuals lead to highly coordinated outcomes like hive-building or predator evasion. Drawing parallels to human history, he noted that early humans succeeded by cooperating in ever-larger groups, with examples such as the Catholic Church and large

corporations like General Motors showing how CI has been central to large-scale organisational success.

The presentation then transitioned to the establishment of the [MIT's Center for Collective Intelligence \(CCI\)](#) in 2009, which was driven by the emergence of new and qualitatively different forms of intelligence enabled by the internet. Unlike traditional organisations, which relied on full-time employees working fixed hours, internet-based systems thrived on small, incremental contributions from people globally. Contributors also participated — not necessarily for financial gain, but to take part in a cause they believed or enjoyed working on. Examples include Wikipedia, driven by volunteer contributors to create high-quality content; and open-source software platforms like Linux and Apache. These platforms demonstrated how countless small efforts could aggregate into larger, impactful outcomes, fundamentally changing the landscape of CI.

Mr Laubacher also mentioned several examples of web-enabled CI, including citizen science projects such as [FoldIt](#) that engage individuals in solving complex protein-folding problems, contributing significantly to biomedical research. Other initiatives like [Molfar](#) gathers open-source intelligence on military conflicts, while crowd prediction platforms like the [Good Judgment Project](#) that leverages the collective insights of individuals to enhance intelligence gathering post-9/11. Innovation contests, like Netflix's million-dollar prize for improving its recommendation algorithm, and online labour markets like [Upwork](#) further demonstrate the power of CI in tapping into discretionary effort.

According to Mr Laubacher, web-enabled CI offers several advantages. One significant benefit is the ability to tap into “cognitive surplus”, a concept coined by internet scholar Clay Shirky, which refers to people's engagement in meaningful contributions during their free time, such as participating in Wikipedia or open-source projects, thereby using their surplus mental capacity for collaborative work. Another advantage is the “wisdom of the crowds”, exemplified by British scientist Francis Galton's experiment, wherein he had asked attendees of a county fair to estimate an ox's weight and found that the average of their guesses was almost exactly the actual weight. This remarkable accuracy illustrates how collective polling can cancel out individual errors and lead to more accurate collective results than what a single person might achieve. Finally, CI also enables the identification of unique talents through innovation contests, which can reveal remarkable talents and insights that might otherwise go unnoticed.

Mr Laubacher then proceeded to discuss the work of MIT's CCI, focusing on three main areas: experimental science to uncover factors influencing group intelligence; collection and analysis of CI case studies; and the development of systems to harness CI. Key projects include the [Genome of Collective Intelligence](#) study, which identified key patterns in crowdsourcing platforms, and the [Climate CoLab](#), a crowdsourcing platform that engaged 100,000 participants in generating climate change solutions. Despite challenges in implementing crowdsourced ideas with established authorities, these projects underscore CI's potential.

A notable advancement in the field is [Supermind Design](#), a method for creating configurations of people and computers to enhance work efficiency. Stemming from Professor Malone's concept of "superminds", which combines human and computer minds to form a more powerful whole, this framework draws inspiration from "super organisms" like ant colonies. Supermind Design emphasises not only CI but also the systems that enable this intelligence to manifest. The aim is to systematically accelerate and enhance collaborative efforts beyond traditional organisational methods.

Unlike organic CI, which evolves through trial and error, Supermind Design leverages design thinking to precisely define problems, generate innovative solutions, and evaluate their effectiveness. Central to this framework are "moves" — specific actions that change system elements step by step. These moves can involve changing aspects of the current design or exploring new human-computer combinations, systematically exploring potential configurations beyond traditional brainstorming methods. Basic moves involve "zooming out" to understand the larger system context and "zooming in" on specific tasks, while advanced moves focus on cognitive processes, such as group decision-making mechanisms, as alternatives to hierarchical structures. The use of technology further supports the decision-making process by processing and remembering outcomes of the moves, i.e. "technifying" decisions. In short, Supermind Design seeks to optimise cognitive processes like creating options, sensing the environment, making decisions and remembering outcomes.

Supermind Design also involves a continuous loop of cognitive processes, starting with an activity and followed by an after-action review to learn and improve future actions. This feedback cycle helps identify key areas where alternative approaches can generate innovative ideas. While traditional hierarchies provide efficiency, Supermind Design also explores alternative decision-making mechanisms like democracies, markets, and communities, each offering diverse input and fostering collective wisdom. Ecosystems, as a more decentralised model, allow for dynamic interactions but require careful consideration of their suitability. Technology significantly enhances these processes by taking over or augmenting human tasks. Platforms like Zoom, Teams, and Slack improve connectivity, while tools such as generative AI and micro-tasking platforms facilitate collaboration and help harness CI.

An example of Supermind Design in action was [a project in Japan addressing depression](#). By expanding the scope of diagnosis beyond doctors to include healthcare system roles like pharmacies and social circles, the design team considered using machine learning to analyse social media posts for early signs of depression. Although this project was not implemented, it sparked ideas now being explored worldwide.

Mr Laubacher then discussed how generative AI, such as ChatGPT, has opened new design process possibilities. The CCI team envisioned large language models (LLMs) as partners in the design process, leading to the development of the [Supermind Ideator](#) platform using OpenAI's GPT-3 and GPT-4 technologies. This platform integrates Supermind Design moves into prompts for LLMs, helping users systematically explore problems and generate solutions. The tool offers a user-friendly interface where individuals can input a problem statement and select modes like "explore problem", "explore solution", or "apply advanced moves". He

demonstrated the tool by exploring ways to help Singapore become a smarter city, emphasising that while the tool is powerful, it does not provide final answers but merely serves as a starting point for further refinement by experts.

In closing, Mr Laubacher emphasised that the platform is continuously evolving, with ongoing efforts to enhance user interaction to create a more intuitive experience. A key objective is to leverage LLMs to evaluate outputs, with early results showing promise in approximating the ratings of professional evaluators. Additionally, the team is working on developing an “ontology of collective intelligence”, supported by Singapore’s National Research Foundation. This initiative aims to classify tasks to enhance idea generation and evaluation tools — much like the classification of living beings — by categorising tasks and recommending ideas within the CI domain. By fostering citizen participation and collaborative problem-solving, Mr Laubacher expressed hope that the full potential of CI could be harnessed to create impactful solutions for society.

Discussions on the Practical Applications and Ethical Considerations in Harnessing Collective Intelligence

Drawing from his extensive background in media and charity work, particularly with the ultra-poor, Mr Steve Loh, Executive Director at the Lien Centre for Social Innovation, highlighted the value of leveraging the intelligence and life experiences of those directly affected by social issues. He emphasised collective problem-solving through asset-based community development, suggesting that community members’ ideas and solutions are key assets. Citing a study published recently, Mr Loh pointed out that the effectiveness of some social programmes is often hindered by the educational gap between social workers and beneficiaries. Conversely, significantly better outcomes were observed when spaces for CI were established, allowing community members to actively participate and offer their insights. To further this approach, he proposed adapting the Supermind Ideator tool for mobile use to facilitate problem-solving within low-income communities. According to Mr Loh, while these communities may lack material resources, they possess critical insights that can be effectively tapped into through such a tool.

In response, Mr Laubacher expressed enthusiasm for developing a mobile version of the Supermind Ideator, agreeing that integrating AI to enhance community-driven solutions could be highly beneficial. Mr Loh elaborated on the potential of the platform to assist an ongoing peer-driven pilot where food-insecure households collaborate to devise solutions. Mr Laubacher then referenced a successful peer-based support initiative in a health clinic, emphasising the potential of such approaches. The conversation highlighted the practical applications of CI and the innovative tools that could address complex social challenges.

Dr Natalie Pang, Associate Professor and Head of Communications and New Media at the National University of Singapore, shifted the focus to the evolving nature of CI and source credibility, raising two pivotal questions. Drawing on her academic background and early studies of the internet in the 1990s, she revisited critiques of the “wisdom of the crowd” concept, often associated with platforms like Wikipedia. Back then, concerns centred on the potential loss of expert knowledge in favour of “amateur” contributions. Wikipedia attempted

to address this issue by emphasising transparency in edits and sources. Fast-forwarding to today's context of generative AI, Dr Pang questioned how source credibility and trust can be maintained when AI-generated content becomes ubiquitous, akin to how Google has integrated into daily life. Her reflections highlighted concerns about the ways people will trust and interact with AI-generated information, underscoring the necessity for transparency in this new digital era.

Her second point addressed marginalised communities and how CI tools like Supermind Ideator might function within these environments. Invoking the concept of “small worlds”, where information circulates within tightly knit communities governed by specific norms, Dr Pang considered how generative AI could influence these norms and act as a community node, shaping information flow and acceptance. She urged the panel to consider how AI might extend and transform traditional community dynamics, especially in terms of trust and collective decision-making.

Mr Laubacher welcomed Dr Pang's reminder of technology's limitations and unintended consequences. He agreed that the rise of online communities has not been entirely positive, with some becoming insular and fostering resentment or misinformation. While tools like Supermind Ideator aim to create positive systems, they must also be mindful of potential negative outcomes, including the “folly of crowds”. He emphasised the importance of anticipating failure modes and pernicious uses of new technology, reflecting on his experience in technology, where optimism about innovation can sometimes overshadow the potential for harm. He echoed Dr Pang's call for collaboration between technologists and humanists to address these risks effectively.

The discussion further touched on the immense power of tools like AI, drawing parallels to historical innovations with unintended consequences, such as the atomic bomb. Mr Laubacher also raised concerns about the impact of AI on creative industries, sharing a personal anecdote about how AI has negatively affected the creative careers of people he knows. Both speakers emphasised the need for careful, thoughtful implementation of AI in communities, with a focus on transparency, accountability and collaboration between various fields of expertise.

Highlights from Question-and-Answer Segment

Question: What are some barriers encountered when trying to implement innovative ideas, as mentioned in the project case study?

Mr Laubacher responded that several barriers are common when trying to implement social innovations, including cultural and regulatory challenges, as well as organisational inertia, particularly in larger institutions like the healthcare system. In the specific case of the earlier mentioned project with the Japanese company, they had lost touch with the organisation due to internal restructuring, which halted progress. These barriers are familiar to anyone working in social innovation. He also noted that there is often difficulty in pitching new ideas to corporate leaders.

Nonetheless, Mr Laubacher shared that they found better success at a more local scale, particularly when they handed their ideas over to a committed partner. He shared that those ideas were more likely to be carried forward, and applying CI at a smaller scale can yield better results than at larger scales.

Question: How do you evaluate the quality of solutions and ideas in the social space, given that they often depend on values or ideology?

Mr Laubacher acknowledged that values are deeply intertwined with goals and aligning goals with one another is crucial in undertaking any solutioning endeavour. In the projects his organisation has worked on, the issue of conflicting values never prominently surfaced because there had been a clear alignment on goals. He shared that in social innovation, however, the challenge is much greater because practitioners often cannot agree on the nature of the social problem itself, thereby making it even harder to evaluate ideas. The concept of “wicked problems” exists as such in social innovation because the issue itself is difficult to define. To directly answer the question, Mr Laubacher shared that in his own work, because he only needed to navigate a more defined space, their evaluation criteria was rather straightforward, and the two key benchmarks he used for determining innovation in their setting was creativity and usefulness.

Question: Are there particular areas to look into regarding privacy laws such as PDPA when it comes to harnessing collective intelligence?

Dr Pang discussed the importance of privacy when it involves vulnerable groups because they often have more personal information collected because of applications for grants and aid. She stressed that it was imperative that we ensure clear boundaries around using personal data with newer technologies like generative AI as it has the potential to perpetuate stereotypes or discrimination if data properly. This is a responsibility that every jurisdiction must undertake based on agreements set within their society and communities.

Mr Laubacher deepened this discussion by opening the topic of ethical considerations when using LLMs for harnessing CI. On top of the concern over AI's potential to use biased data leading to discrimination, LLMs have used massive amounts of content created by writers and artists, and they are not compensated for it. Many people also do not fully understand the privacy trade-offs they make online in exchange for convenience, like personalised recommendations. This is a complex issue both for CI and internet commerce.

One participant brought up a case from their own field of work whereby they collect data to match employers with domestic workers where they sometimes encounter personal information that requires them to make a moral decision on whether to report it or not. Dr Pang used this example to highlight the important role that data controllers play in pushing the model from a consent-based one to an accountability-based one wherein even with consent, data controllers should apply judgment about what to include, especially if the data could harm the person or others. She stressed the importance of striking a balance between consent and

responsibility, which is a constant tension as sensitive data can be crucial for finding solutions, but the protection of privacy especially for vulnerable communities is equally a priority.

Question: How does the Supermind platform incorporate the voices, language, and cultural contexts of marginalised or third-world communities when addressing wicked problems?

Mr Laubacher acknowledged that the model is primarily trained on internet-based content, potentially introducing biases that may not align with specific local contexts. However, the platform allows for some customisation by feeding it specific documents or inputs relevant to the situation, such as local government reports. For example, in a project related to Haiti, US government documents were input into the Supermind Ideator to provide more contextual understanding. While this method shows promise, it is still in its early stages. One potential solution could be to engage directly with the affected communities to gather their insights and approaches to solving local problems. By collecting this data — through interviews, recordings, or transcripts — and feeding it into the platform, Mr Laubacher believes that could help the platform's outputs better reflect the voices and needs of those communities. This community-driven data could complement or even replace more official or academic sources, allowing the platform to generate more culturally appropriate solutions.

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