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Concept Note

Reimagining Philippine Education in the Era of Education 5.0: Empowering Teachers through Generative Artificial Intelligence and Design Thinking

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ABSTRACT

Persistent challenges in Philippine education, as highlighted by the EDCOM II reports, continue to affect learning outcomes and system efficiency across levels, placing considerable pressure on teachers who must manage overlapping administrative responsibilities, curriculum demands, and classroom needs. As the nation moves toward the vision of Education 5.0, an era that emphasizes innovation, adaptability, and the integration of technology, teachers face additional expectations to transform their practice within a still-developing educational landscape. Much remains to be done to strengthen the foundations of Philippine education and to prepare educators for these shifts. This concept note considers two complementary approaches, Design Thinking and Generative Artificial Intelligence (AI), as potential frameworks to support teachers in this period of educational transformation. Nonetheless, several critical questions remain: (1) How can Design Thinking and Generative AI be combined to support teachers' instructional tasks? (2) What guidelines are necessary to help teachers use Generative AI productively and responsibly? and (3) How can the education system create an enabling environment where both Design Thinking and Generative AI can thrive? This concept note introduces the DT-AI (Design Thinking–Artificial Intelligence) Model, a conceptual framework that integrates the empathic, problem-solving principles

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of Design Thinking with the adaptive, data-driven capabilities of Generative Artificial Intelligence. The DT-AI Model positions teachers as reflective designers who co-create learning experiences with AI as a cognitive partner, enhancing creativity, efficiency, and contextual relevance. It also highlights the need for systemic readiness, ethical guidelines, and capacity-building initiatives that enable responsible and meaningful AI use in education.

Introduction

Philippine education remains in crisis, as revealed by the EDCOM II Year One Report (2023), *Miseducation: The Failed System of Philippine Education*, and the Year Two Report (2024), *Fixing the Foundations: A Matter of National Survival.* These reports expose persistent issues of poor learning outcomes, weak curriculum implementation, teacher shortages, and fragmented governance across all levels of education—from K-12 to higher education (EDCOM II, 2024, 2025).

Schools continue to grapple with resource shortages, overcrowded classrooms, and limited access to quality learning materials. At the core of these challenges are teachers, who carry the heaviest weight in a system struggling to reform itself. They are expected to deliver quality instruction, manage large classes, and adapt to continuous policy changes while also completing numerous administrative tasks. Many teachers report feeling overwhelmed by the dual pressure to improve student outcomes and comply with bureaucratic requirements. With limited time for lesson design, collaboration, or reflection, their role as designers of learning is often diminished. As a result, teachers find themselves caught between meeting institutional demands and nurturing genuine learning—an imbalance that hinders creativity and innovation in the classroom (EDCOM II, 2024, 2025).

Amid these persistent challenges, the Philippine education system is also navigating a broader transformation shaped by the vision of Society 5.0, a framework that promotes a balance between technological innovation and human well-being (Faresta et al., 2025; Tavares et al., 2022). In alignment with this, Education 5.0 advocates for learning environments that cultivate creativity, collaboration, and innovation through the ethical and purposeful use of technology. This paradigm calls for an education system that not only integrates digital tools but also fosters human-centered values (Erita et al., 2024; Shahidi Hamedani et al., 2024). However, questions remain regarding the system's readiness for such a transition. Gaps in curriculum alignment, teacher capacity, and digital infrastructure continue to hinder progress, suggesting that the realization of Education 5.0 in the Philippines will require substantial groundwork and sustained support.

In the transition toward Education 5.0, the role of teachers expands from facilitation to co-creation and collaboration with emerging technologies. This paradigm envisions a learning ecosystem where technology amplifies human creativity and empathy, positioning teachers as designers of meaningful learning experiences. Yet, as teachers navigate growing expectations amid limited resources and rapid technological change (Chemsi et al., 2024; Khang et al., 2023) their ability to innovate often outpaces the institutional support available to sustain it. At the core of this challenge is the widening gap between what teachers are expected to achieve and the support systems needed to help them thrive in a technology-driven era.

This concept note considers two interrelated approaches—Design Thinking and Generative Artificial Intelligence (AI)—as pathways for teacher empowerment. Design Thinking offers a process for addressing instructional challenges through empathy and creativity, while Generative AI provides technological support for ideation, lesson design, and innovation (Choi et al., 2024; Eamcharoen, 2024). Together, these approaches may enable teachers to craft more dynamic, relevant, and human-centered learning experiences aligned with the vision of Education 5.0.

However, several critical questions remain to be explored in understanding how these frameworks can be effectively integrated into the Philippine education context:

1. How can Design Thinking and Generative AI be combined to support teachers' instructional tasks?
2. What guidelines are needed to help teachers use Generative AI productively and responsibly?
3. How can the education system create an enabling environment where both Design Thinking and Generative AI can thrive?

Society 5.0 and Education 5.0

The concept of Society 5.0 originated in Japan as a national vision to address the rapid technological transformations of the 21st century. It signifies a shift from a technology-driven and automation-focused society toward a human-centered one that seeks to harmonize technological innovation with social well-being (Faresta et al., 2025). At its core, Society 5.0 envisions the integration of advanced technologies—such as artificial intelligence (AI), robotics, the Internet of Things (IoT), and big data—to address complex societal challenges and improve quality of life. Rather than viewing technology as an end, this framework emphasizes its role to achieve sustainable, inclusive, and equitable human development (Behare et al., 2024; Tavares et al., 2022).

Building on the vision of Society 5.0, Education 5.0 serves as its educational counterpart, translating the idea of a human-centered society into learning and teaching practices. It envisions an education system that prepares learners to be innovative, adaptable, and socially responsible in a technology-driven world (Naraidoo et al., 2024). Rather than

emphasizing rote memorization, Education 5.0 promotes the development of higher-order thinking skills such as creativity, critical thinking, collaboration, and lifelong learning. This paradigm shifts positions education not merely as the transmission of knowledge but as the cultivation of human potential, enabling individuals to thrive amid technological advancement while upholding ethical and social values (Ahmad et al., 2023).

As Education 5.0 advances, innovation must be grounded in ethical responsibility and the thoughtful use of emerging technologies such as Generative AI. These tools hold immense potential to enhance learning, streamline administrative work, and assist teachers in creating engaging educational experiences (Fousiya & Saleem, 2024; Guettala et al., 2024). However, their integration also raises important questions about authenticity, data privacy, intellectual ownership, and human judgment. Teachers therefore play a crucial role in ensuring that technology complements, rather than replaces, the human dimension of teaching and learning. Striking this balance requires clear ethical guidelines and professional support systems that help educators use technology purposefully and responsibly within the broader vision of Education 5.0 (Pratyusha & Varghese, 2024; Sabharwal & Mitra, 2024).

Design Thinking for Teachers

Design Thinking (DT) is a tool for innovation and a problem-solving process that emphasizes empathy, creativity, and experimentation. It involves understanding human needs deeply, reframing problems from multiple perspectives, and developing solutions through iterative cycles of ideation, prototyping, and testing (von Thienen et al., 2018). It is regarded as a future-centered approach because it does not end with a single solution; rather, it continuously evolves in response to emerging challenges and changing contexts (Razzouk & Shute, 2012). Through its iterative nature, Design Thinking encourages ongoing reflection, redesign, and improvement—qualities that make it an excellent construct for navigating rapidly changing environments, particularly in the digital era (Johansson-Sköldberg et al., 2013). Although it has proven to be a powerful method for generating innovative outcomes, it can also be challenging to apply, as it requires collaboration, open-mindedness, and persistence throughout the creative process (Dorst, 2011).

The origins of Design Thinking can be traced to the field of design and engineering, where it was initially developed as a method for creating user-centered products and solutions. Early applications were rooted in industrial and product design, particularly in architecture and engineering, where understanding users' needs was crucial to functional and aesthetic outcomes (von Thienen et al., 2018). Over time, the concept expanded beyond design disciplines into management and organizational innovation, gaining prominence as a framework for creative problem-solving in business and technology sectors. This evolution marked a shift from viewing design merely as a technical skill to recognizing it as a mindset and process that could be applied across diverse contexts to foster innovation and address complex, human-centered challenges (Brown, 2008).

As Industry 4.0 demanded innovators capable of creativity, collaboration, and problem-solving, Design Thinking expanded beyond its roots in engineering and business to become an essential framework in educational settings (Eamcharoen, 2024; Hennessey & Mueller, 2020). Its early applications were seen in higher education—particularly in engineering, product design, and management programs—where students were encouraged to develop design thinking skills as preparation for the rapidly changing demands of the workforce (Dym et al., 2005). Over time, its relevance extended other fields and in the basic education, where it began to be used to nurture creativity, empathy, and critical thinking among students(Choudhary & Sharma, 2024; Eamcharoen, 2024; Hennessey & Mueller, 2020)

In the Philippine context, however, Design Thinking remains a relatively new and underexplored approach, with only a few studies examining its use in classroom practice (Erenea & Sarmiento, 2025). Most existing literature focuses on student outcomes, while limited research has explored how teachers themselves can apply Design Thinking as a framework for lesson development and instructional innovation (Gagaza & Sarmiento, 2022). Yet, in the era of technological transformation, the role of teachers as designers of learning is increasingly vital. Teachers must cultivate the same creative and solution-oriented mindset that Design Thinking promotes, enabling them to design meaningful and adaptive learning experiences. Thus, beyond its roots in business or engineering, Design Thinking offers a practical and transformative approach for educators seeking to respond innovatively to evolving educational challenges (Eamcharoen, 2024; Montero-Mesa et al., 2023).

Generative Artificial Intelligence in Education

Generative Artificial Intelligence (AI) refers to a branch of artificial intelligence capable of creating new content—such as text, images, audio, or data—based on patterns learned from existing information. Unlike traditional AI systems that simply analyze or classify data, generative AI can produce original outputs that resemble human-generated work. The rise of large language models, particularly OpenAI's ChatGPT launched in late 2022, marked a major turning point in its accessibility and adoption. Since then, generative AI has rapidly expanded across sectors, including education, where it is increasingly recognized as a transformative tool for automating tasks, enhancing creativity, and supporting personalized learning experiences (He & Lu, 2024; Matthew et al., 2024).

Generative AI represents a breakthrough in education because of its capacity to enhance teaching efficiency, creativity, and strategic decision-making. For teachers, it serves as a powerful cognitive assistant that can support various instructional and administrative tasks. It can help generate lesson plans, suggest learning materials, create assessments, and provide formative feedback aligned with learning objectives (Evmenova et al., 2024; Kiryakova, 2024). However, rather than replacing teachers, Generative AI functions as a collaborative tool—requiring educators to critically review, align, and refine AI outputs to ensure contextual and pedagogical appropriateness. In this way, teachers take on a more strategic role, guiding

the responsible use of AI to improve learning design and student engagement. By streamlining routine processes, Generative AI helps lessen teachers' workload and opens more space for reflective, creative, and higher-order teaching practices.

Despite its vast potential, the use of generative AI in education also presents significant challenges. Instances of unethical or excessive reliance on AI tools have raised concerns about academic integrity, intellectual laziness, and the diminishing of critical thinking skills among students. These issues have shaped teachers' perceptions of AI, often associating it with plagiarism, misinformation, and overdependence on technology (Magat & Sangalang, 2024; Patrício & Gonçalves, 2024). As a result, many teachers remain cautious or hesitant to integrate generative AI into their teaching practices or to encourage its use among students. This apprehension is rooted not only in ethical concerns but also in uncertainty about how to effectively and safely harness AI's potential for learning.

However, generative AI should not be viewed as a threat but as an opportunity for responsible innovation. Instead of evading its use, educators must learn to engage with it critically and ethically. Teachers play a central role in modeling proper AI use—guiding students to verify information, analyze AI-generated content, and recognize limitations such as factual inaccuracies or "hallucinations." When teachers understand how AI systems function and integrate them thoughtfully into instruction, they can transform potential risks into meaningful learning opportunities, fostering both digital literacy and ethical awareness in the classroom.

Harnessing Design Thinking and Generative AI for Teacher Innovation

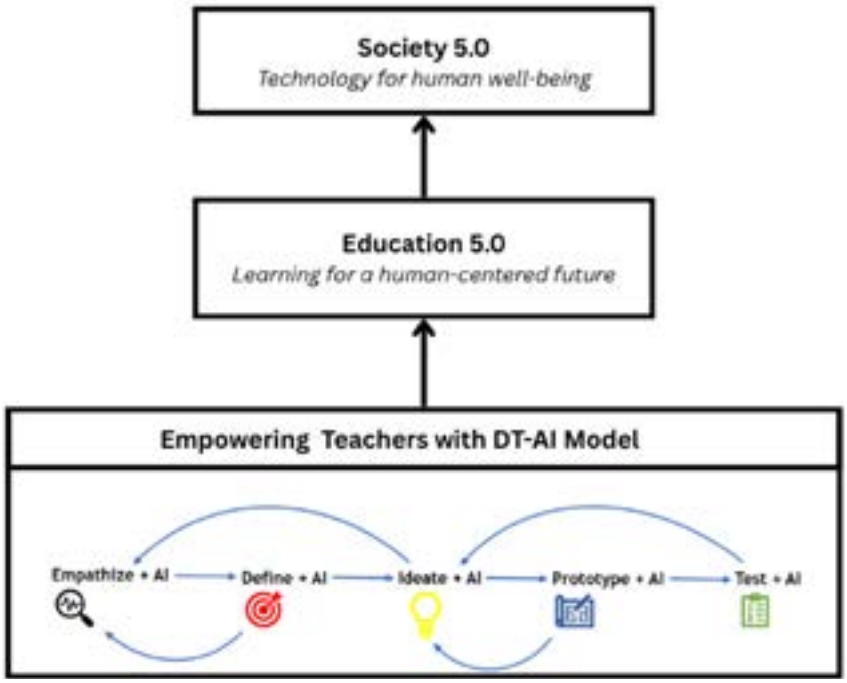
Education 5.0 aligns with the future vision of Society 5.0, which envisions the use of technology for human well-being and sustainable societal advancement. To prepare an education system responsive to these evolving needs, this concept note integrates Design Thinking and Artificial Intelligence (AI) into a unified framework—forming the DT-AI Model for teacher empowerment. Design Thinking, while inherently rigorous, becomes more streamlined and adaptive when complemented by Generative AI, which serves as a cognitive partner across all stages of the process. In the Empathize phase, AI helps analyze learner data to uncover authentic needs; in Define, it assists in synthesizing insights and framing problems; in Ideate, it supports the generation of creative instructional ideas; in Prototype, it helps refine materials and lesson designs; and in Test, it aids in evaluating and improving instructional outcomes. Through this synergy, teachers are equipped not only to design responsive lessons but also to foster human-centered innovation aligned with the demands of Education 5.0.

The novel contribution of this framework lies in the integration of AI and Design Thinking—two domains that are relatively new when combined, especially in the context of Philippine education. This alignment positions the DT-AI Model as a transformative approach that bridges the goals of Education 5.0, learning for a human-centered future, and Society 5.0, technology for human well-being. By joining these two paradigms, the model

empowers teachers to act as designers of learning who leverage AI ethically and creatively to generate innovative instructional tasks and context-driven solutions to the challenges they face. Figure 1 illustrates this conceptual integration, showing how the DT-AI Model connects the educational and societal goals of the 5.0 era through empowered, future-ready teachers.

Figure 1

DT–AI Model for the Era 5.0



An example of how the DT-AI Model can be applied in practice is demonstrated through a study involving five Grade 9 Mathematics teachers who integrated Design Thinking (DT) and Generative AI in lesson design. The study resulted in the development of a lesson design framework that utilized ChatGPT across all phases of the Design Thinking process. The successful application of this approach illustrates how the DT-AI Model can serve as a new framework for teacher professional development and instructional design, equipping teachers to collaborate effectively with AI in creating contextualized, innovative, and human-centered lessons. Design Thinking provided an approach to create innovative lessons anchored in real student needs, while ChatGPT streamlined and enhanced the process by acting as a cognitive tool and assistant that supports idea generation, material refinement, and reflection. This integration proved more powerful than using either approach alone—Design Thinking supplied the ethical and empathetic foundation that mitigates AI's risks, while Generative AI accelerated the DT process, making it more efficient and feasible for time-constrained teachers.

The findings emphasize that the human element remains indispensable in this integration. Teachers exercised critical judgment in evaluating AI-generated content, refining ideas, iterating designs, and aligning materials with learner context and curriculum standards—ensuring that technology enhanced rather than replaced professional expertise. As a case study, the research involved a small but in-depth sample focused on Mathematics, offering rich insights while recognizing its limited generalizability. Nevertheless, the findings suggest that the DT-AI Model holds potential for broader application across other subject areas. Feedback from teacher participants also highlighted the importance of curriculum readiness and an enabling environment to fully harness the benefits of AI and Design Thinking in schools.

Despite these promising outcomes, much remains to be learned about how to use Generative AI responsibly and effectively in education. Moving forward, there is a pressing need to establish a comprehensive set of ethical and practical guidelines for its use. This concept note calls for continued exploration of how DT-AI can be integrated into various areas of education where creative problem-solving, instructional design, and curriculum development are needed. The goal is not merely to adopt technology but to understand it deeply—so that teachers, students, and institutions can use it meaningfully, ethically, and with sustained human oversight.

The DT-AI approach offers actionable insights for strengthening innovation in education.

- For Teachers: Strengthen AI literacy and develop a Design Thinking mindset through sustained professional learning that promotes empathy-driven and reflective lesson design.
- For Administrators: Provide systemic and technical support to manage workloads and create enabling environments for DT-AI integration.
- For Policymakers: Establish ethical guidelines and institutional frameworks that embed DT-AI principles within curriculum and teacher training programs.

These directions underscore the collective need to support educators, promote responsible AI use, and foster a reflective culture that aligns innovation with the evolving goals of Era 5.0.

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