Journal of International DBA Studies (JIDS)
Vol. 1 No. 002 (2025) https://eaj.ebujournals.lu/index.php/JIDS/index

Practice-Led Case Study of Workforce Transformation through National AI Prompt Design Challenges in Singapore and the Philippines

by

Kevin Shepherson, Celine Chew and Seema Purohit *

* Kevin Shepherson is CEO of Straits Interactive, Singapore and international privacy expert. Celine Chew is Head of Learning and Development of Straits Interactive and Affiliate Faculty at Singapore Management University Academy. Seema Purohit is a Global Professor of Practice at Golden Gate University, trailblazer in AI / ML and Data Science with 35 years of expertise at the intersection of research and development of computational modeling, and cutting-edge technology.

Abstract

The rapid rise of generative artificial intelligence (GenAI) has intensified the need to reskill non-technical professionals, who make up the majority of the workforce yet are often left out of AI development initiatives. This practice-led study investigates whether nontechnical knowledge workers can, through structured bootcamps and time-bound competitions, transition from AI consumers to AI creators within hours. Using the Generative AI Capability Framework (comprising knowledge, skills, tools, processes, and culture), the study analyzed nearly 1,100 participants in the National AI Prompt Design Challenges held in Singapore (2024) and the Philippines (2025). Participants received training in large language model fundamentals, prompt engineering, Chain-of-Thought prompting and responsible AI safeguards before building applications on the no-code Capabara platform. Findings show rapid capability gains in knowledge, skills and tool use, particularly among students who demonstrated creativity and agility, while professionals contributed domain grounding but faced execution and integration challenges. Persistent gaps in workflow embedding and responsible AI practices highlight process and culture as the weakest dimensions. Cross-country comparisons revealed Singapore's maturity in governance but risk aversion, contrasted with the Philippines' grassroots creativity but weaker safeguards. The study contributes empirical evidence to theories of digital workforce transformation, offering practical insights for educators, organizations and policymakers on designing inclusive capability-building strategies that balance innovation with responsibility.

Keywords: workforce transformation, generative AI, prompt engineering and Chain-of-thought, practice-led research, competencies and capability frameworks, digital transformation in Asia (Singapore, Philippines), Capabara platform

Introduction

The accelerating pace of digital transformation has made workforce reskilling at the center of organization and society. Global studies warn of widening gap between technological innovation and workers' ability to adapt, up to 44% of core skills expected to change within the next five years (Bouwmans et al., 2024; World Economic Forum, 2024). The rise of generative AI (GenAI) is reshaping knowledge work at an unprecedented scale. Scholars emphasize that transformation requires cultural change, critical awareness and systematic capability-building across the workforce (Verhoef et al., 2021; Vial, 2019) not passive adoption of new tools.

Most current policies and investments have concentrated on the 20% of workers in technical roles (CompTIA, 2024; U.S. Bureau of Labor Statistics, 2025), often overlooking the 80% of non-technical professionals whose domain expertise anchors the relevance, reliability and contextual accuracy of GenAI outputs. This imbalance has left many nontechnical workers perceiving AI development as inaccessible, fueling anxiety about displacement and exclusion.

Addressing this gap requires GenAI application development accessible to all professionals, equipping them to translate their knowledge into AI-enabled tools. Emerging frameworks emphasize that workforce transformation requires both technical proficiency and critical awareness of AI's risks and governance requirements (Choi et al., 2025; Long & Magerko, 2020). Responsible AI practices, ethical safeguards, domain expertise boundaries and defense against adversarial or "red team" prompts, are increasingly recognized as essential for sustainable adoption.

To explore how such inclusive capability-building might be achieved in practice, this study designed and implemented the National AI Prompt Design Challenge (Challenge) in Singapore (2024) and the Philippines (2025). Unlike conventional AI hackathons that target technical specialists, this competition was purpose-built for non-technical professionals and students. Each challenge combined a 3 to 4-hour bootcamp, covering large language model fundamentals, advanced prompt design, AI governance and app development, with a time-bound competition. Participants created AI applications using the Capabara platform. Capabara is a no-code environment that enables users to design and deploy AI-powered tools, without requiring programming expertise.

The intervention was structured around the Generative AI GenAI Capability Framework (GenAI Capability), which conceptualizes workforce transformation as five interconnected dimensions:

1. **Knowledge** - understanding AI fundamentals, limitations and appropriate use cases
2. **Skills** - practical competencies in prompt design, iteration and evaluation
3. **Tools** - proficiency with accessible AI platforms and interfaces
4. **Processes** - applying AI to workflows, integrating responsible AI
5. **Culture** - a digital transformation mindset that embraces experimentation, learning, and ethical boundaries

By using this framework, the study sought to test whether participants could rapidly create functional GenAI applications and to identify which dimensions of capability were well developed and which were lacking across different contexts.

A total of 1,100 participants across both countries took part. This dual-country implementation allowed for comparative insights between a developed economy (Singapore) and a developing economy (Philippines), as well as between younger participants and working professionals.

The primary research question is: "Can non-technical knowledge workers, when guided through structured prompt design techniques, responsible AI practices (including adversarial prompt defense), and no-code AI app development platforms, rapidly translate their domain expertise into functional and responsible AI applications within a short time frame?"

This research question is significant because it directly operationalizes the GenAI Capability in a real-world context. It examines how all five dimensions manifest when non-technical professionals are guided through structured prompt design and responsible AI practices. The study addresses a critical and underexplored segment of the workforce, ensuring the intervention moves beyond theory to produce measurable, sustainable and ethical outcomes. It also aims to generate actionable insights for empowering broad segments of the workforce to adopt GenAI responsibly, making it conceptually robust and strategically relevant.

To address the main question, the analysis is guided by the following sub-questions, organized by dimension:

Knowledge

1. To what extent do participants from Singapore and the Philippines demonstrate understanding of AI fundamentals, appropriate use cases and responsible practices after intervention?

Skills

2. How effectively do non-technical knowledge workers learn and apply prompt design, iterate and evaluate techniques?
3. How do youth/student submissions compare with open/professional submissions in terms of quality and innovation?

Tools

4. How proficient are participants in using no-code AI app development platforms? What barriers do they encounter in accessing or utilizing these tools?

Processes

5. What types of real-world problems did participants address through their AI apps, and how do these reflect industry and societal needs?
6. In what ways were participants able to integrate AI tools and prompt workflows into their domain-specific tasks or organizational processes, including responsible-use practices such as adversarial prompt defense?

Culture

7. How do outputs differ between Singapore and the Philippines?

Holistic

8. Which elements of the GenAI Capability were most evident and which were underdeveloped?

This study contributes to the growing literature on AI-enabled workforce transformation by providing practice-led, comparative evidence of how non-technical workers can transition from passive AI consumers to active AI creators. It offers practical insights for educators, organizations, and policymakers on how to design scalable interventions that balance rapid skill acquisition with responsible AI practices.

Literature Review

Knowledge: AI Literacy and Foundational Understanding

Digital transformation is considered an organizational and cultural transformation requiring systematic capability development not just technological (Verhoef et al., 2021; Vial, 2019). Sustainable transformation depends on building a workforce that can adapt and integrate new technologies into existing processes, not merely adopt tools superficially. Brynjolfsson & McAfee (2017) argue that technology alone does not drive productivity gains unless matched with new skills, organizational processes and management practices. This aligns with Teece's (2018) theory of dynamic capabilities, which emphasizes that organizations must continuously adapt and reconfigure their skills and processes to rapidly changing.

Capability building is increasingly viewed as a holistic construct that incorporates knowledge, skills, tools, processes and culture. Organizational learning theories (Argyris & Schon, 1995) underscore that culture and mindset are critical enablers of long-term adaptation. For GenAI in particular, this framing is crucial, as the technology enables non-technical knowledge workers to move from passive consumers to active co-creators of AI-enabled applications.

Skills: Prompt Engineering and Applied Competence

While AI literacy provides essential conceptual grounding, workforce transformation depends on developing practical skills to apply GenAI tools effectively. The distinction between literacy (knowing about AI) and capability (applying AI to create value responsibly) is central to this study. Scholars argue that AI adoption requires ability to adapt workflows, critically evaluate outputs and iteratively refine solutions (Long & Magerko, 2020).

One of the most novel skills to emerge is prompt engineering, the practice of crafting natural language instructions to guide large language models (Chen et al., 2025). Unlike programming, which demands formal technical training, prompt engineering allows domain experts to operationalize their expertise directly. Scholars and practitioners have described it as the “new digital literacy” (Korzyński et al., 2023). Effective prompt design involves iterative refinement, creativity and techniques such as Chain-of-Thought prompting (Wei et al., 2022) to scaffold reasoning and enhance reliability. Educational technology research highlights that structured, hands-on learning environments, such as bootcamps or hackathons, accelerate such skill acquisition, especially among non-coders (Herbsleb et al., 2018).

In this study, prompt engineering serves as the primary applied skill for testing whether non-technical professionals can translate their knowledge into working AI applications, and the outputs differ across demographic groups of students and working professionals.

Tools: No-Code Platforms and Accessibility

Workforce participation in GenAI development also depends on accessible tools. Traditional AI development workflows rely on coding, specialized infrastructure and advanced data science skills, these barriers often exclude the 80% of non-technical professionals (CompTIA, 2024; U.S. Bureau of Labor Statistics, 2025). Recent advances in no-code and low-code platforms have lowered these barriers by allowing users to build AI-powered applications through graphical interfaces, prebuilt components and natural language interactions.

Human–Computer Interaction (HCI) and User Experience (UX) research has shown that interface design and usability strongly influence tool adoption, especially among novice users (Komssi et al., 2015). However, digital divide effects, such as unequal access to reliable internet or modern hardware, still limit adoption in developing contexts (UNESCO, 2023). Industry white papers from leading AI providers (OpenAI, Microsoft, Google) emphasize the need for inclusive design and equitable access to AI tools.

In this study, the use of Capabara serves as a critical test of tool accessibility: whether non-technical participants can rapidly become proficient and what usability barriers they may encounter.

Processes: Workflow Integration and Responsible AI Practices

Building AI capability also requires embedding tools and skills into real-world workflows. Research on AI implementation in knowledge-intensive sectors shows that the success of AI projects depends on how well they are integrated into existing processes, organizational structures and decision-making routines (Brynjolfsson & McAfee, 2017). Effective integration involves both technical fit and ethical governance considerations.

The risks of GenAI adoption, such as hallucination, bias and over-reliance, are well documented (Bommasani et al., 2021). A growing body of literature highlights adversarial prompting risks (e.g., prompt injection and jailbreaking) that can manipulate models into producing harmful or unintended outputs (Lin et al., 2024; Majumdar et al., 2025). Standards such as ISO/IEC 42001:2023 recommend “red teaming” approaches that simulate adversarial use cases to test model safety.

Embedding these practices into workforce training ensures that non-technical professionals learn to create value and also anticipate risks, apply safeguards and establish governance boundaries. This study examines whether participants could build apps, and whether they integrated responsible-use practices into their designs.

Culture: Mindsets, Ecosystems, and Socio-Technical Contexts

Workforce transformation depends on cultural conditions that support experimentation, continuous learning and ethical awareness. Organizational learning research emphasizes that culture and mindset are central enablers of adaptation (Argyris & Schon, 1995). Innovation diffusion studies further show that attitudes toward risk-taking, failure tolerance and collaboration shape technology adoption trajectories (Rogers, 2003).

National digital cultures and socioeconomic conditions also influence how GenAI adoption unfolds. In Singapore, mature innovation ecosystems and extensive government-led digitalization initiatives (Infocomm Media Development Authority & Lee Kuan Yew School of Public Policy, National University of Singapore, 2023) have fostered relatively high baseline readiness. In contrast, Philippines faces more fragmented infrastructure and less coordinated upskilling support (Department of Information and Communications Technology, 2024), with a large, eager and youthful workforce. Comparative socio-technical studies suggest such contextual differences shape access and mindsets toward experimentation and responsible AI use.

By comparing participant outputs and experiences across these two settings, this study investigates how cultural and contextual factors mediate GenAI capability-building outcomes.

Research Gap and Contribution

Despite growing attention to AI literacy, responsible AI practices and workforce reskilling, there remains limited empirical evidence on how non-technical professionals can transition from AI consumers to AI creators. Most existing studies and policy efforts disproportionately target technical workers such as engineers and data scientists, even though they represent roughly 20% of the workforce (CompTIA, 2024; U.S. Bureau of Labor Statistics, 2025). The remaining 80% knowledge workers (e.g., educators, managers, healthcare providers, lawyers) are central to ensuring contextual relevance, reliability and ethical use of AI outputs (Choi et al., 2025; Long & Magerko, 2020).

Comparative research examining how this majority group can be equipped to build AI-enabled solutions remains scarce, particularly across contrasting socioeconomic contexts. In Southeast Asia, there is little evidence on how workforce interventions can work across different economies, where infrastructure, digital culture and institutional support differ significantly. Moreover, few studies integrate responsible AI safeguards into workforce capability-building efforts, despite growing importance for safe AI deployment (International Organization for Standardization, 2023; Lin et al., 2024).

This study addresses these gaps by:

1. Providing practice-led, comparative evidence from Singapore and the Philippines.
2. Testing whether non-technical participants can create functional and responsible
3. GenAI applications within hours using a no-code platform.

4. Mapping outcomes against the framework to identify strengths, weaknesses and capability gaps across the five dimensions.
5. Offering insights into how responsible AI practices can be taught at scale.

By doing so, the study contributes to both the academic discourse on digital transformation and to practical strategies for inclusive workforce reskilling.

Hackathons, AI Competitions, and Novelty of Prompt Design Challenges

Hackathons and innovation competitions have long been recognized as effective mechanisms for stimulating creativity, fostering collaboration and rapidly prototyping technological solutions (Briscoe, 2014; Komssi et al., 2015). Research shows that these time-bound, team-based challenges accelerate learning and innovation by encouraging experimentation, risk-taking and iterative problem-solving (Herbsleb et al., 2018). Universities, corporations, and governments have widely used hackathons to generate new products, stimulate entrepreneurship and identify emerging technical talent.

However, traditional hackathons typically target developers, engineers and programmers, relying heavily on coding skills and technical infrastructure. While effective for technical communities, such formats often exclude non-technical knowledge workers who may lack programming expertise but possess the domain-specific knowledge essential for creating contextually relevant solutions.

The emergence of GenAI introduces a paradigm shift. With no-code and low-code platforms, domain experts can now design and deploy AI applications without advanced technical skills. This opens hackathon-style competitions to new audiences: non-technical professionals and students who can leverage their subject matter expertise to design AI=driven solutions.

Few documented studies have examined competitions explicitly designed for this broader segment of the workforce. Existing reports on AI hackathons (Gama et al., 2023) focus largely on data science problems, emphasizing algorithm design, predictive modeling or technical optimization. By contrast, the challenge represents a novel competition format, where the emphasis shifts from coding to prompt design, chain-of-thought reasoning, responsible AI safeguards and the translation of domain expertise into functional applications.

Traditional hackathons measure technical innovation (new algorithms, APIs or systems). Prompt Design Challenges measure applied capability, whether non-technical professionals can rapidly transform their knowledge into functional AI applications while balancing value creation with risk awareness.

Such competitions may represent a new methodology for workforce development research. Combining the experiential learning strengths of hackathons with inclusivity for 80% of the workforce who are non-technical knowledge workers. They also enable comparative cross-cultural research, as no-code platforms levels the playing field for participants regardless of technical background.

Summary of Literature Review

This review has highlighted that sustainable digital transformation requires more than isolated technical training; it demands the development of integrated capabilities across five dimensions: knowledge, skills, tools, processes, and culture. Existing research underscores persistent gaps in AI literacy and responsible use among non-technical professionals, who constitute the vast majority of the workforce, yet remain underrepresented in AI upskilling efforts.

While emerging practices such as prompt engineering and no-code platforms offer pathways for broader participation, their effectiveness depends on accessible tools, structured learning experiences, ethical safeguards, and supportive cultural contexts. Few studies, however, have empirically examined how non-technical workers can transition from AI consumers to AI creators in real-world settings, particularly across contrasting national contexts such as Singapore and the Philippines. Addressing this gap, the present study applies a practice-led design to investigate how structured prompt design training, responsible AI practices, and no-code app development can collectively build generative AI capability, offering new insights into scalable and inclusive workforce transformation.

Research Design and Methodology

Research Design

This study adopts a practice-led research design, positioning the National AI Prompt Design Challenge as a live laboratory for investigating workforce transformation in the age of generative AI. Practice-led research emphasizes inquiry through action and reflection within authentic contexts (Gama et al., 2023), making it suitable for exploring how non-technical professionals engage with emerging technologies in real-world conditions.

By embedding a competitive challenge within a structured learning framework, the design enabled the simultaneous study of capability acquisition, application and evaluation under time-bound, high-engagement conditions. This approach directly addresses the primary research question: Can non-technical knowledge workers, when guided through structured prompt design techniques, responsible AI practices, and no-code AI app development platforms, rapidly translate their domain expertise into functional and responsible AI applications?

The intervention combined two components:

1. Bootcamp (3–4 hours): Participants were introduced to large language models, advanced prompt design techniques including Chain-of-Thought (CoT) prompting, responsible AI practices and app development using a no-code platform.
2. Prompt Design Challenge (3 hours for students; next-day submission for professionals): Participants created AI applications addressing real-world problem categories such as productivity, education, wellbeing and business management.

Participants

Nearly 1,100 participants across Singapore and the Philippines took part in the 2024–2025 editions of the challenge. The participant pool is comprised of:

- Youth/Students: Secondary, tertiary, and early university students (aged 13–22) and
- Open/Professionals: SMEs, corporate employees, freelancers, and consultants.

Participation was voluntary, with individuals and teams self-registering online. This self-selection introduced a bias toward those already curious about generative AI, though not necessarily technically skilled. To mitigate this, analysis focused on comparative trends across countries and participant categories rather than generalizing to the entire population.

Intervention Design

Bootcamp: The bootcamp curriculum was framed using the **Generative AI Capability Framework**, which defines five interconnected dimensions of capability:

1. **Knowledge** - AI fundamentals, limitations, and responsible use cases
2. **Skills** - Practical application of prompt engineering, including CoT techniques
3. **Tools** - Use of the Capabara Generative AI Platform, a no-code environment enabling participants to build apps with structured inputs, prompts, and user interfaces
4. **Processes** - Workflows for app design, testing, and governance integration
5. **Culture** - Fostering a digital transformation mindset emphasizing experimentation, error tolerance, and ethical responsibility

Key topics included:

- Introduction to large language models (LLMs)
- Advanced prompt techniques: role-based prompting, few-shot prompting, CoT prompting
- Designing apps on Capabara with structured user/system prompts, input fields, grounding content, and rules
- Basics of responsible AI, including risks of hallucination, bias, and misuse
- Adversarial prompt training (red teaming): stress-testing apps against prompt injection, prompt leaking, and jailbreaking

The bootcamp served as both training and scaffolding, equipping participants with baseline capability to attempt app creation in the subsequent challenge.

Competition: Participants created one functional AI application within a time-limited design window:

- Youth category: Apps completed and submitted within 3 hours on the same day (Singapore leg only)
- Professional category: Apps submitted by 23:59 the following day
- Problem categories spanned:

- Productivity (compliance/legal, HR, customer service, sales, marketing/ communications)
- Education (holistic education, student wellbeing, teacher productivity, parental support)

Apps ranged from role-play tutors and wellbeing assistants to productivity bots and compliance tools.

Development Platform

The Capabara Generative AI Platform functioned as the enabling environment. Designed as a no-code solution, Capabara allows users to create apps:

- Combining user prompts, system prompts, CoT steps, rules, and input fields
- Embedding multimedia or external data sources
- Choosing between multiple LLMs for app deployment
- Deploying apps with a functioning user interface in minutes, without programming.

This platform was crucial for democratizing participation, enabling non-technical users to translate domain expertise into apps rapidly.

Evaluation Criteria

Submissions were evaluated by panels of industry experts, academics and practitioners. Each submission was independently scored by at least two judges to enhance inter-rater reliability. The top entries were scored by six judges. The evaluation rubric was mapped to the ISO/IEC 5338 AI Systems Life Cycle, particularly the Design and Development stage. To ensure that submissions were judged on technical performance as well as value creation, usability and responsible AI integration, each app was scored on:

1. Functionality - Reliability and alignment with the problem statement
2. User Experience (UX/UI) - Intuitiveness, clarity and usability of the interface
3. Innovation - Originality and creativity in applying GenAI features
4. Benefit & Potential - Scalability, relevance and potential impact
5. Security & Ethical Standards - Responsible AI safeguards, handling of sensitive cases and adversarial prompt resilience (e.g. prompts to create recipes)

Data Sources and Analysis

Quantitative data were analyzed using descriptive statistics to compare trends by country and participant type. Qualitative data were thematically coded to identify evidence of capability dimensions, innovation patterns, and responsible AI practices. This mixed-methods approach enabled comparative analysis (Singapore vs Philippines; Youth vs Professionals) while also surfacing deeper insights into competencies, gaps and responsible AI integration.

The quantitative and qualitative data consisted of:

- Quantitative: Number and type of submissions by country and category; frequency of problem domains; rubric scores
- Qualitative: App descriptions; detailed review of top ten winners in each category; judges' feedback; excerpts from participant interviews on challenges faced, learning experiences, and recommendations

Ethical Considerations

No personal or sensitive participant data were collected. The focus of analysis remained at the level of app submissions and aggregate trends. Participants provided informed consent during registration, acknowledging that their submissions could be analyzed for research purposes. Institutional Review Board (IRB) approval was not required given the non-sensitive nature of the data.

The study incorporated responsible AI safeguards into both the training and evaluation processes. By teaching participants adversarial prompt testing (red teaming) and disqualifying unsafe apps, the competition itself modeled ethical guardrails.

Data Analysis Framework

To link participant outputs to the Generative AI Capability Framework, the study employed a structured data analysis framework that mapped each capability dimension to specific indicators, data sources, and analytical methods. This ensured alignment between the research question, the intervention design, and the evaluation process. Refer to Appendix A Table 1 for Data Analysis Framework.

To synthesize findings across the five dimensions, the study adopted a convergent mixed-methods strategy, integrating quantitative rubric scores with qualitative thematic evidence from judges' feedback, participant interviews and app descriptions. Quantitative data established comparative trends across participant types and national contexts, while qualitative insights illuminated how and why certain capabilities emerged or remained underdeveloped. This approach enabled both dimension-specific analysis and holistic capability profiling, supporting nuanced comparisons across participant categories (youth vs professionals) and contexts (Singapore vs Philippines) within the Generative AI Capability Framework.

Limitations of the Study

Several limitations should be noted. First, judging variability may have influenced outcomes, as panels emphasized different criteria such as creativity, safety, or usability. Second, differences in partnerships and outreach shaped participation, with Singapore drawing more SMEs and governance sectors, and the Philippines more students and education-related entries, limiting comparability. Third, variations in competition format (same-day vs. next-day submissions) affected performance, giving professionals more time and peer input.

Fourth, the practice-led, time-bound design revealed rapid capability acquisition but not long-term adoption or integration; longitudinal studies are needed. Fifth, responsible AI safeguards were unevenly enforced, with disqualifications reflecting both clear overreach and subjective judgments. Finally, national contexts differed: Singapore's institutional maturity contrasted with the Philippines' grassroots priorities, making cross-country comparisons indicative rather than definitive.

These factors clarify the study's boundaries and highlight the need for further longitudinal and cross-context research.

Findings and Analysis

Findings are presented comparing outcomes between Singapore vs. Philippines, outcomes across (students vs. professionals, then thematically across the five dimensions of the Generative AI Capability Framework (Knowledge, Skills, Tools, Processes, Culture), Evidence is drawn from quantitative submission data, judges' rubric evaluations, participant interviews and case reviews of winning entries. To preserve narrative flow, this section highlights the most salient cross-country and cohort patterns, while extended quantitative breakdowns (including full sectoral counts and rubric distributions) are consolidated in Appendix A for readers who require detailed tabular data.

Cross-Country and Cohort Overview

Participant Breakdown

Nearly 1,100 participants joined across two national challenges. Refer to Appendix A Table 2 for tabular participant breakdown.

- **Singapore** - 177 teams (461 participants): 83 youth/student teams (215 participants), 94 professional/open teams (246 participants). Student participation was heavily weighted toward secondary and tertiary institutions.
- **Philippines** - 193 teams (593 participants): 85 youth/student teams (238 participants), 108 professional/open teams (266 participants).
- Both countries achieved a near 50/50 youth-professional split, supporting robust comparisons.

While gender data was not specifically collected, it was observed that across both challenges, gender representation was broadly mixed in youth and professional cohorts, with women and men participating in teams across all major problem domains. These demographic patterns indicate promising diversity, particularly strong female representation among student cohorts, but also reveal underrepresentation in some sectors such as finance and insurance.

Sectoral Orientation (Professional vs. Youth)

Participants reflected a broad demographic spread across sector categories spanning education, healthcare, public services, consultancy, and other industries. Professional submissions reflected different orientations between Singapore and the Philippines. Refer to Appendix A Table 3 for tabular data of submissions by industry.
Shared anchors: Professional Services (33–35%) and Education & Research (21– 25%) dominated, confirming that knowledge-intensive sectors are the earliest adopters of GenAI.

- **Singapore:** Broader distribution across Non-Profits (12%), Public Sector & Legal (12%), and Tech & Telecommunications (11%), reflecting institutional maturity and a strong service economy.
- **Philippines:** Higher representation in Healthcare (7%), Media (8%), and Transportation (6%), reflecting grassroots priorities and citizen-facing needs.

Student submissions also revealed common priorities but with distinct national emphases:

- **Shared anchors:** Education and Wellbeing dominated in both countries, confirming that youth participants gravitated toward foundational learning and personal development challenges.
- **Philippines:** Over 70% of entries focused on Holistic Education (46%) and Student Wellbeing (25%), reflecting a strong orientation toward employability pathways and social support.
- **Singapore:** A more balanced distribution, with about 66% of entries in education/wellbeing and 34% in productivity domains (HR, sales, customer service, R&D), reflecting closer alignment with workplace readiness and organizational contexts.

Key Cohort Patterns

Judges feedback on problem statements

- **Students:** Outperformed professionals in execution and creativity; strong CoT use, gamification and empathetic design but prone to adversarial prompt leaks and shallow content. Students (SG) focused on learning and wellbeing, Philippine entries leaned toward societal and career guidance priorities whereas Singaporean entries showed stronger links to workplace and productivity applications.
- **Professionals:** Strong domain grounding and workplace relevance, but more disqualifications and lower UX/app logic scores.

(Refer to Appendix Table 4 for judges' feedback on problem statements.)

Knowledge

Participants in both countries quickly absorbed GenAI fundamentals (prompt–response dynamics, hallucination risks, responsible use).

Strengths

- SG students embedded crisis protocols and hotlines (e.g., *Apollo Friendz*, *MindfulMentor*).
- PH entries aligned with national frameworks (*SkillSpark*, *SIBOL*), showing contextual grounding.

Weaknesses

- Inconsistent awareness of limitations: 25% of entries showed poor contextual grounding.
    - SG research apps defaulted to U.S. sources.
    - PH finance apps applied U.S.-centric budgeting (50/30/20 model) unsuitable for local incomes.

Implication: Knowledge transfer was fast but often shallow; localized knowledge frameworks are needed.

Skills

Prompt engineering, particularly Chain-of-Thought (CoT) prompting, was rapidly adopted, especially by students.

Strengths

- Students structured logic effectively and iterated prompts based on outputs.
    - SG's *Teachers' Life Balancer* (4.8/5) showed clear sequencing.
    - PH's *Adaptive Wellness Coach* demonstrated innovative wellbeing flows.
- Judges noted students outperformed professionals on execution quality in at least three major categories (Education, Wellbeing, Teacher Productivity).

Refer to Appendix A Table 4 Problem Statement Comparison (Judges' Feedback)

Weaknesses

- Professionals often submitted one-pass builds lacking iterative refinement, resulting in rigid or incomplete logic.
- Domain knowledge didn't translate into app logic fluency or evaluation cycles.

Implication: Students showed stronger learning agility; professionals require scaffolding in iterative design and testing.

Tools

The Capabara Generative AI Platform enabled rapid prototyping by non-technical users.

Strengths

- Both groups built functioning apps within 3–4 hours post-bootcamp.
- High-performing apps used platform features effectively (SG *GrantGenie*, PH
    - *Lakb.ai*, *Export Buddy PH*).

Weaknesses

- 30–40% of submissions resembled basic FAQ-style bots with minimal multimedia, grounding content, or UI design.
- Participants cited barriers in integrating multimedia, designing UI, and linking user inputs to outputs.

Implication: While the platform democratized access, structured design templates are needed to push beyond surface-level builds.

Processes

Process integration was the weakest dimension across both countries.

Findings

- Fewer than 15% of apps described how they would embed into real workflows (HR systems, school operations, government platforms).
- Many apps were built as standalone demos rather than sustainable tools.
- Responsible AI gaps were frequent:
    - SG: *Tenancy Analyzer* and *Medicine Explainer* were disqualified for lacking legal/medical oversight as well as qualified professional expertise.
    - PH: Many entries failed adversarial tests, drifting into unsafe outputs (e.g., bedtime stories, sex content, cooking recipes).

Implication: Without workflow design and guardrails, apps remain isolated prototypes, limiting organizational adoption.

Culture (Digital Transformation Mindset)

Cultural approaches diverged sharply by age and national context.

- Students: Youth participants demonstrated high openness to experimentation, creativity, and risk-taking. Apps often incorporated gamification and empathetic design (e.g., *Zombie Maze*, *ScoutPal*). Their willingness to "fail forward" drove innovation but frequently overlooked ethical safeguards, leaving apps vulnerable to adversarial misuse.
- Professionals: Professional participants approached GenAI development with caution and accountability. Many embedded disclaimers (e.g., "consult lawyer," "seek medical advice") in sensitive apps, reflecting workplace responsibility. However, this risk aversion often produced conservative or under-ambitious designs with limited novelty.

  Cross-Country Patterns**.** Singaporean entries reflected broader institutional orientations—compliance, governance, and consultancy—while Philippine entries emphasized societal and cultural relevance, such as education, public services, and heritage (*ApoKu* on Kapampangan culture). Judges noted that students were more frequently ranked among the most innovative, while professionals were more often disqualified for incomplete or overly cautious submissions.
- Implications. Cultural orientations strongly shaped outcomes. Students contributed momentum and creativity but require ethics scaffolding; professionals contributed responsibility and domain grounding but need stronger incentives to innovate. Balancing these cultural tendencies is essential for sustainable workforce transformation.

Sector Snapshots

- **Education & Research:** A leading sector in both countries (21-25%), reflecting GenAI's early uptake in knowledge-intensive domains. Singaporean apps leaned toward institutional tools such as curriculum planners and research proposal support, while Philippine apps emphasized classroom relevance and local curriculum alignment (e.g., *Bilang Buddy*, *SIBOL*). Strengths included clear use cases, but weaknesses involved U.S.-centric sources and shallow outputs.
- **Professional Services:** The single largest category (33-35%), dominated by HR, compliance, and consultancy tools. Singaporean entries reflected maturity in advisory and governance contexts, while Philippine entries highlighted entrepreneurial and export-oriented solutions (e.g., *Export Buddy PH*). Strengths were clear domain grounding, but execution quality and UI/UX often lagged.
- **Healthcare & Public Services:** More prominent in the Philippines (7% healthcare, 6% transport) than in Singapore (3% and 1%, respectively). Philippine submissions tackled citizen-facing needs such as sexual health and travel planning, often with strong cultural grounding but weak safeguards. Singaporean entries were fewer but tended to include disclaimers and ethical framing.

Other Sectors: Smaller clusters included finance, media, tech, and non-profits. Both countries struggled in finance, with simplistic or unrealistic budgeting tools. Singapore

had more activity in non-profits and tech (12% and 11%), while the Philippines emphasized media (8%) and grassroots tools, including cultural heritage apps (e.g., *ApoKu*). These niches showed creativity but frequently lacked scalability or resilience. Refer to Appendix A Table 5 Judge's Feedback by Sectors (Singapore vs Philippines)

Implication: Sectoral patterns confirm that GenAI adoption is strongest in education and professional services, but national contexts shape secondary priorities: institutional maturity in Singapore versus societal and citizen-facing needs in the Philippines.

Holistic Evaluation

When mapped holistically, participant outputs reveal uneven development across the five dimensions of the Generative AI Capability Framework. Under knowledge cohort pattern, participants demonstrated basic GenAI fundamentals and incorporated responsible-use cues such as hotlines and references to local frameworks. However, many solutions showed shallow contextual grounding and relied heavily on U.S.-centric sources. In Skills, students displayed strong use of CoT prompting and structured logic, whereas professionals showed weaker iteration practices. For Tools, teams were effective at rapid prototyping but demonstrated limited use of features and often produced weak UI/UX designs. For Processes, a few high quality applications stood out, most have minimal workflow integration and exhibited safety failures. Finally, for Culture, students exhibited bold creativity while professionals were more cautious, resulting in an uneven balance between risk-taking and risk-aversion. Refer to Appendix A Table 6 for tabular data on Strengths and Gaps of Apps created across Dimensions.

Judges' consensus: Workforce transformation requires balanced development across all five dimensions, not just technical skill acquisition but also process embedding, responsible AI safeguards, and cultural change.

Summary of Findings and Analysis

Across nearly 1,100 participants in Singapore and the Philippines, the National AI Prompt Design Challenges demonstrated that non-technical youth and professionals can rapidly acquire generative AI capabilities when supported by structured bootcamps and no code tools. Participants showed strongest development in Knowledge, Skills and Tools, with students excelling in CoT prompting, creativity and execution and professionals contributing domain expertise and workplace relevance.

However, capability building was constrained by persistent gaps in Processes (workflow integration, responsible AI safeguards) and Culture (balancing experimentation and risk aversion). These patterns reflect broader national contrasts, Singapore's institutional orientation versus the Philippines' societal orientation, and highlight the need for holistic strategies that combine youth agility with professional depth to achieve sustainable workforce transformation.

This study shows both the promise and limitations of rapid capability-building for non-technical professionals in the age of Generative AI (GenAI). Using the Generative AI Capability Framework in the National AI Prompt Design Challenges in Singapore and the Philippines, we found that participants could shift from passive AI consumers to active

creators within hours. This supports the framework's central claim that workforce transformation requires not just technical skills alone.

A critical tension emerged across the framework's five dimensions. Participants advanced rapidly in knowledge, skills, and tool use, with students excelling in creative design and CoT prompting, while professionals leveraged domain expertise to produce workplace relevant concepts. Yet both groups struggled with processes (workflow integration, scaling, responsible AI guardrails) and culture (balancing experimentation with accountability). These gaps suggest that capability-building efforts which focus only on technical or creative aspects risk producing isolated prototypes rather than sustainable, embedded solutions.

National context further shaped these patterns. Singapore participants reflected institutional maturity and stronger responsible AI framing but often produced rigid designs constrained by risk aversion. Philippine participants demonstrated high creativity and societal relevance but lacked consistent safeguards, branding, and scalability. These contrasts show how socio-economic context and digital readiness influence which capabilities develop most strongly and which remain underdeveloped.

Together, these insights suggest that achieving broad-based workforce transformation in GenAI will require holistic strategies that blend the agility and experimentation of youth with the domain depth and responsibility of professionals, supported by structured scaffolding in workflow integration, UI/UX execution and red-teaming practices.

Theoretical Implications

By operationalizing the Generative AI Capability Framework in a live setting, this study demonstrates that capabilities can emerge quickly but unevenly. Three contributions follow.

- Knowledge, skills, and tool use can develop synergistically through scaffolded training, challenging assumptions that technical literacy must precede creative application.
- Sustainable transformation depends on technical competence as well as embedding responsible AI norms and workflow integration, clarifying where theoretical and instructional attention should concentrate.
- Cross-country contrasts highlight that capability trajectories are shaped by institutional maturity and socio-economic context, structures that may reinforce responsibility but constrain creativity, or encourage innovation but weaken safeguards.

Together, these findings refine the framework as a dynamic model of GenAI transformation shaped by both individual learning and systemic conditions.

Practical Implications

This study shows that while non-technical workers can rapidly gain GenAI knowledge, skills, and tool use, sustainable transformation requires stronger attention to processes and culture within the Generative AI Capability Framework.

- For educators, scaffolded, practice-led training is effective, but must embed domain grounding, red-teaming, and ethical design so creativity aligns with responsible use.
- For organizations, training should extend beyond individual upskilling to workflow integration, supported by templates, sandboxing, cross-functional teams and governance protocols (e.g., ISO/IEC 5338).
- For policymakers, ecosystem-level enablers are vital, such as cross-sector collaborations, localized knowledge frameworks and national standards that balance innovation with safeguards.

Overall, capability-building must cultivate technical competence and the cultural mindsets and institutional structures needed for responsible, scalable adoption of GenAI.

Policy and Ecosystem Implications

Cross-country contrasts show that isolated training is insufficient; sustainable transformation requires ecosystem-level policies that align education, industry and innovation agendas. Singapore's maturity fostered compliance but limited creativity, while the Philippines' grassroots energy spurred cultural relevance but lacked safeguards and scalability.

National frameworks should embed the Generative AI Capability Framework into digital skills strategies, ensuring curricula combine AI fundamentals, prompt design, and responsible use, supported by localized datasets. Public funding and incentives can expand participation through national challenges and sector-specific exemplar projects, while cross-sector consortia can develop content libraries, red-teaming toolkits, and ethical certification schemes.

The two national challenges suggest that prompt-focused bootcamp-and-challenge formats can function as a generic pattern for GenAI workforce development, not only in national competitions but also inside firms, universities, and public-sector academies. When combined with structured governance templates and red-teaming practices, the same format can be adapted for continuous upskilling cycles in organizational or government-led programs, where teams periodically prototype and embed GenAI tools into operational workflows.

Although this study focused on two national challenges, the Prompt Design Challenge model is modular and can be scaled by aligning with emerging skills and micro-credential frameworks. In Southeast Asia, the competency elements in the Generative AI Capability Framework can be translated into stackable micro-credentials in national digital-skills standards and regional frameworks such as ASEAN's digital literacy and skills initiatives. At the global level, the model aligns with UNESCO's emphasis on AI literacy and responsible use. This positions prompt-design competitions as a practical means for advancing AI literary and fluency policies and for accrediting GenAI capabilities within broader lifelong learning ecosystems.

At the same time, regulatory frameworks must integrate responsible AI standards (e.g., ISO/IEC 5338) and establish oversight mechanisms such as ethics boards or

sandboxes to balance innovation with trust. In sum, ecosystems must democratize access, localize knowledge, and institutionalize safeguards to scale GenAI adoption responsibly.

Conclusion

This study examined whether non-technical knowledge workers can, through structured bootcamps, responsible AI practices, and no-code platforms, rapidly translate their expertise into functional GenAI applications. Across nearly 1,100 participants in Singapore and the Philippines, the findings confirm this shift from AI consumers to creators is possible within hours.

Analysis using the Generative AI Capability Framework showed strong development in Knowledge, Skills, and Tools but persistent gaps in Processes and Culture. Students demonstrated agility and creativity, often outperforming professionals in execution, yet lacked responsible guardrails. Professionals contributed domain depth but struggled with design, iteration and workflow integration. National contrasts reinforced these imbalances: Singapore emphasized compliance and governance, while the Philippines prioritized education, public services and citizen services relevance.

Sustainable adoption will therefore require strategies that combine youth creativity with professional expertise, embed GenAI into workflows, and institutionalize responsible AI practices across education, organizations, and national ecosystems.

Closing Reflection

The National AI Prompt Design Challenges acted as practice-led laboratories of workforce transformation, showing that the future of GenAI adoption depends not only on technical specialists but also on the ability of ordinary knowledge workers to turn expertise into solutions. Embedding the Generative AI Capability Framework offers a pathway to scale this transformation responsibly, balancing agility with expertise, experimentation with governance, and creativity with institutional integration.

References

Argyris, C., & Schon, D. A. (1995). *Organizational learning II: Theory, method, and practice*.Addison-Wesley. https://us.sagepub.com/sites/default/files/upmbinaries/9799_037065ch2.pdf

Bommasani, R., Hudson, D. A., Adeli, E., Altman, R., Arora, S., von Arx, S., Bernstein, M. S., Bohg, J., Bosselut, A., Brunskill, E., Brynjolfsson, E., Buch, S., Card, D., Castellon, R., Chatterji, N., Chen, A., Creel, K., Davis, J. Q., Demszky, D., & Liang, P. (2021). *On the Opportunities and Risks of Foundation Models*. *arXiv Preprint*. https://doi.org/10.48550/ARXIV.2108.07258

Bouwmans, M., Lub, X., Orlowski, M., & Nguyen, T. T. (2024). Developing the digital transformation skills framework: A systematic literature review approach. *PLoS ONE*, *19*(7). https://doi.org/10.1371/journal.pone.0304127

Briscoe, G. (2014). *Digital innovation: The hackathon phenomenon*. https://api.semanticscholar.org/CorpusID:31734217

Brynjolfsson, E., & McAfee, A. (2017). The Business of Artificial Intelligence. *Harvard Business Review*, *1*, 1–31. https://hbr.org/2017/07/the-business-of-artificialintelligence

Candy, L. (2006). *Practice based research: A guide* (No. 1). Creativity and Cognition Studios. https://www.creativityandcognition.com/resources/PBR%20Guide-1.1-2006.pdf

Chen, B.-C., Zhang, Z., Langrené, N., & Zhu, S. (2025). Unleashing the potential of prompt engineering for large language models. *Patterns*, 101260. https://doi.org/10.1016/j.patter.2025.101260

Choi, W. C., Chang, C. I., Choi, I., Lam, L. C., Leong, K., & Ng, S. (2025). Artificial intelligence (AI) literacy in education: Definition, competencies, opportunities and challenges. *Preprints*. https://doi.org/10.20944/preprints202508.0497.v1

CompTIA. (2024). *State of the tech workforce: Cyberstates 2024* [Report]. Computing Technology Industry Association. https://www.comptia.org/en/resources/research/state-of-the-tech-workforce-2024

Department of Information and Communications Technology. (2024). *Measuring Digital Development: The ICT Development Index Report 2024—A Briefer on the Philippines' ICT Development*. Department of Information and Communications Technology. https://ictstatistics.dict.gov.ph/wp-content/uploads/2024/08/Updated-IDI-Briefer-Final.pdf

Gama, K., Valença, G., Alessio, P., Formiga, R., Neves, A., & Lacerda, N. (2023). The developers' design thinking toolbox in hackathons: A study on the recurring design methods in software development marathons. *International Journal of Human–Computer Interaction*, *39*(12), 2269–2291. https://doi.org/10.48550/arXiv.2206.04744

Herbsleb, J., Than, E., Nolte, A., Filippova, A., Bird, C., & Scallen, S. (2018). *Designing corporate hackathons with a purpose*. IEEE Software, *36*(1), 15–22. https://doi.org/10.1109/MS.2018.290110547 Infocomm Media Development Authority & Lee Kuan Yew School of Public Policy,

National University of Singapore. (2023). *Singapore Digital Economy Report 2023*

[Report]. Infocomm Media Development Authority & Lee Kuan Yew School of Public Policy, National University of Singapore. https://www.imda.gov.sg//media/imda/files/infocomm-media-landscape/research-and-statistics/sgdereport/singapore-digital-economy-report-2023.pdf

International Organization for Standardization. (2023). *ISO/IEC 42001:2023 Information technology—Artificial intelligence—Management system*. https://www.iso.org/standard/42001

Komssi, M., Pichlis, D., Raatikainen, M., Kindstrom, K., & Järvinen, J. (2015). What are hackathons for? *IEEE Software*, *32*(5), 60–67. https://doi.org/10.1109/MS.2014.78

Korzyński, P., Mazurek, G., Krzypkowska, P., & Kurasiński, A. (2023). Artificial intelligence prompt engineering as a new digital competence: Analysis of generative AI technologies such as ChatGPT. *Entrepreneurial Business and Economics Review*, *11*(3). https://doi.org/10.15678/eber.2023.110302

Lin, L., Mu, H., Zhai, Z., Wang, M., Wang, Y., Wang, R., Gao, J., Zhang, Y., Che, W., Baldwin, T., Han, X., & Li, H. (2024). Against The Achilles' Heel: A Survey on Red Teaming for Generative Models. *arXiv Preprint*. https://doi.org/10.48550/ARXIV.2404.00629

Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. https://doi.org/10.1145/3313831.3376727

Majumdar, S., Pendleton, B., & Gupta, A. (2025). Red Teaming AI Red Teaming. *arXiv Preprint*. https://doi.org/10.48550/ARXIV.2507.05538

Rogers, E. (2003). *Diffusion of Innovations 5th*. Free press. https://teddykw2.wordpress.com/wp-content/uploads/2012/07/everett-m-rogersdiffusion-of-innovations.pdf

Teece, D. J. (2018). Dynamic capabilities as (workable) management systems theory. *Journal of Management & Organization*, *24*(3), 359–368. https://doi.org/10.1017/jmo.2017.75

UNESCO. (2023, November). *How generative AI is reshaping education in Asia-Pacific*. https://unes.co/80dex0

U.S. Bureau of Labor Statistics. (2025). *Employed persons by detailed occupation and age*. https://www.bls.gov/cps/cpsaat11.htm

Verhoef, P., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Wei, J., Wang, X., Schuurmans, D., Bosma, M., Ichter, B., Xia, F., Chi, E., Le, Q., & Zhou, D. (2022). Chain-of-Thought Prompting Elicits Reasoning in Large Language Models. https://doi.org/10.48550/ARXIV.2201.11903

World Economic Forum. (2024). *Leveraging Generative AI for Job Augmentation and Workforce Productivity: Scenarios, Case Studies and a Framework for Action*.

https://www.weforum.org/publications/leveraging-generative-ai-for-jobaugmentation-and-workforce-productivity/

Appendix A

Table *1*

Data Analysis Framework

Capability Dimension	Key Indicators	Data Sources	Analytical Methods
Knowledge	Demonstrated understanding of AI fundamentals, limitations, and responsible use cases	Participant interviews; judges' qualitative feedback on conceptual accuracy and ethical awareness	Thematic coding of feedback and interviews for conceptual clarity, appropriateness of use cases, and ethical reasoning
Skills	Quality, accuracy, and iterative refinement of prompts; application of Chain-of-Thought techniques; innovation level	App designs (prompt structures, CoT steps); judges' scores on innovation; review of top 10 winners per category	Rubric-based scoring (innovation + functionality); qualitative analysis of prompt logic and iteration patterns
Tools	Proficiency with the Capabara Generative AI Platform; UI/UX quality; ability to build working apps	Platform usage logs; app interface design; judges' UX/UI scores	Descriptive statistics of completion rates and functionality; UX/UI rubric scoring
Processes	Integration of AI into domain-specific workflows; real-world relevance of app purpose; inclusion of responsible AI safeguards	App descriptions and features; problem categories; judges' scores on functionality and ethical standards	Cross-tabulation by problem domain and participant type; thematic analysis of responsible AI implementation
Culture	Evidence of experimentation, risk taking, and ethical mindset; differences across national contexts	Post-event interviews; country level comparison of submission diversity and themes	Comparative thematic analysis (Singapore vs Philippines); coding for attitudes and cultural markers
Holistic	Overall capability balance across all dimensions	Aggregated rubric scores; qualitative synthesis of judges' panel notes	Triangulation of scores, themes, and participant reflections to identify strengths and gaps

Table 2

Participation Breakdown (Singapore vs. Philippines)

Country	Youth / Student Teams	Professional / Open Teams	Total Teams	Total Participants
Singapore (SG)	83 (215 participants)	94 (246 participants)	177	461
Philippines (PH)	85 (238 participants)	108 (266 participants)	193	593

Table 3

Distribution of Professional Submissions by Industry (% of total)

Industry Sector	SG Professionals	PH Professionals
Education & Research	21%	25%
Finance & Insurance	2%	3%
Healthcare & Life Sciences	3%	7%
Media, Entertainment & Platforms	6%	8%
Miscellaneous / Other	7%	4%
Non-Profit Agencies & Associations	12%	0%
Professional Services	33%	35%
Public Sector & Legal	12%	4%
Retail, E-commerce & Consumer	1%	4%
Tech & Telecommunications	11%	2%
Transportation & Travel	1%	6%
Total	**100%**	**100%**

Table 4

Problem Statement Comparison (Judges' Feedback)

Problem Statement	SG Students - Judges' Feedback	PH Students - Judges' Feedback	Comparative Insight
1A: Sales & Marketing	Creative attempts, some structured (*EduWizard*, campaign bots). Weaknesses: often basic/unoriginal, UX issues, many apps jailbroken into giving recipes.	Workplace relevance present (*PlanPal*, HR/benefits overlap). Weaknesses: simplistic, hackable (export app diverted to kangaroo imports).	Both countries struggled here; SG apps showed more structure, PH more workplace alignment. Weaknesses in responsible AI were common.

1B: Human Resources	Strong app (*Onboarding Programme* 4.6/5). Range of quality, but many easily jailbroken, novelty low.	HR apps basic (resume, benefit reminders). Practical but lacked innovation.	SG produced stronger, more functional HR tools; PH focused on practicality but weaker innovation.
1D: Customer Service	Practical training bots, some resilient (Employee Training app). Weakness: many apps shallow or diverted to irrelevant tasks.	Few entries, mostly incomplete or simplistic.	SG stronger in this domain with some high-quality outputs; PH weak presence.
1E: Research & Development	Good structured apps (*Spearhead Research Project*, *GrantGenie*). Weakness: some too rule-based, shallow guidance.	Some innovative (*Bilang Buddy* for math teaching). Weakness: rigid, often blank or failed grounding.	Both showed promise; SG leaned to academic/proposal tools, PH to classroom-focused tools.
1F: Legal & Compliance	Only a few apps created. Limited examples.	Some tried but lacked domain expertise, vulnerable to misuse.	Both countries struggled here - domain-heavy apps beyond students' expertise.
2A: Holistic Education	High creativity (*AI Career Advisor*, gamified apps like *Zombie Maze*). Weaknesses: unclear purpose, unrealistic ideas, adversarial vulnerabilities.	Strong creativity (*Kasanayan Navigator*, *SkillSpark*, *ScoutPal*). Weaknesses: many apps were basic planners/schedulers, rigid input flows, hackable (adobo/sinigang recipes).	Both highly creative, but SG apps leaned on gamification/adaptiveness, PH on employability/career pathways. Both had responsible AI gaps.
2B: Student Wellbeing	Strongest category (*Apollo Friendz*, *MindfulMentor*). High empathy, included SOS hotlines, good CoT. Weakness: cluttered design, some irrelevant outputs (chicken rice).	High potential (*Adaptive Wellness Coach*, *Major Explorer*). Weakness: many generic, repetitive; responsible AI gaps (snacks, sex positions).	Both countries excelled; SG apps stronger on empathy/crisis safeguards, PH apps stronger on creativity but less safe.

2C: Digital Wellbeing	Addressed cyber wellness, student digital habits. Weaknesses: UX issues, misaligned conversations.	Addressed onboarding, CCTV tools (*BuyAHawk*). Strength: multimedia integration. Weakness: inconsistent recommendations, poor branding.	SG stronger in cyber wellness focus, PH stronger in practical digital habits/tools. Both inconsistent in execution.
2D: Enhancing Teacher Productivity	Very strong apps (*Teachers' Life Balancer* 4.8/5). Clear navigation, sequencing. Weakness: some easily broken.	Good apps (*SIBOL* teacher onboarding). Some tools blank/undeveloped.	Both strong, with SG stronger on execution/scoring; PH showed innovation grounded in teacher experience.
2E: Supporting Parents & Families	Strong apps (*Transition Period AI Tool Helper* 4.8/5). Weakness: overscoping (too many combined functions), prompt hacks (recipes, storm the capital).	Apps like *myGabay* (driver's license guide) showed societal relevance. Weakness: poor branding alignment, rigid flows, hackable.	SG stronger on structured execution; PH stronger on societal relevance. Both inconsistent in responsible AI.

Table 5

Judges' Feedback by Sectors (Singapore vs Philippines)

Industry Sector	SG Professionals - Judges' Feedback	PH Professionals - Judges' Feedback	Comparative Insight
Education & Research	Strong apps: curriculum planners, oral practice bots, grant proposal analyzers. Weaknesses: many defaulted to US sources, overburdened users, shallow outputs.	Practical teacher tools (*SIBOL*, *Bilang Buddy*), aligned with local curriculum. Weaknesses: repetitive schedulers, some disqualified for adversarial hacks (recipes, D&D).	Both strong, but SG leaned toward institutional/research tools, PH toward classroom-level and curriculum alignment. Both vulnerable to adversarial prompts.
Finance & Insurance	Weakest sector: too generic, failed adversarial prompts, missing/broken links. Some repeated financial jargon.	Weak overall: simple budgeting apps, unrealistic models (50/30/20 rule), hackable (apps diverted to networking).	Both countries underperformed here. PH showed more local adaptation attempts but lacked realism; SG tools felt generic.

Healthcare & Life Sciences	Some thoughtful tools (pregnancy guides, distress management), with disclaimers. Weaknesses: limited innovation, poor local grounding.	Tackled taboo topics (sexual health, wellness). Strength: safe private chat space. Weakness: frequent irrelevant/diverted outputs (condoms, coding).	SG stronger on safety/disclaimers, PH stronger on social relevance but weaker on responsible AI safeguards.
Media, Entertainment & Platforms	Apps for marketing/advertising, some creative (*campaign bots*), but many too simple or unprofessional.	Creative branding (*AS Kween*, *Lyvo*), multimedia integration Weaknesses: weak novelty, hackable to off-topic.	CBoth creative but shallow; SG weaker on tone/professionalism, PH stronger branding but poor responsible AI control.
Miscellaneous / Other	Niche apps (construction, manufacturing, utilities) - structured but often just FAQs.	Agriculture (*AgriSagot*), NGO tools (*AlonBot*). Strength: bilingual/localized relevance. Weakness: repetitive, technical timeouts.	SG focused on industry productivity, PH on grassroots/community issues. Both lacked polish/scalability.
Professional Services	Largest sector. Apps for compliance, HR, consultancy. Strength: clear use cases. Weakness: rigid flows, fragile execution. Disqualified apps	Also largest sector. Apps like *Export Buddy PH*, *CLARA* (FGD), *Kai* coaching. Strength: high creativity. Weakness: execution gaps,	Both strongest here. SG: institutional/compliance focus, PH: entrepreneurial/export orientation. Both marred by responsible AI failures.
	(tenancy analyzer, medicine explainer).	unclear flows, adversarial leaks (bedtime stories, kangaroos).	
Public Sector & Legal	Strong civic apps (Budget Buddy, procurement evaluators). Strength: disclaimers, local hotlines. Weakness: narrow scope, scalability issues.	Civic utilities (*eGuidePH*, *myGabay*, *Building Code Assistant*). Strength: clear societal relevance. Weakness: weak grounding, poor branding, disqualifications.	SG apps more institutionally polished; PH apps more socially relevant but weaker execution.

Retail, E-commerce & Consumer	Very few entries, mostly loyalty/event apps. Weakness: repetitive recommendation engines.	Few but creative (*ApoKu* cultural learning). Strength: cultural branding. Weakness: niche, hackable.	Small in both countries. SG leaned corporate/consumer, PH leaned cultural/educational.
Tech & Telecommunications	IT support, troubleshooting bots. Some used Chain-ofThought. Weakness: repetitive, impractical dashboards.	Apps like *BuyAHawk* (CCTV advisor). Strength: localized practical advice. Weakness: clunky UI, missing vendor integration.	SG: technical depth but dry UX. PH: practical, localized tools but execution weak.
Transportation & Travel	Logistics-focused (*ShippingSmart*). Strength: clear UX, disaster prep info. Weakness: limited novelty.	Travel planners (*Lakb.ai*). Strength: localized, flexible itineraries. Weakness: limited adaptability, overreliance on Q&A.	SG: institutional/logistics. PH: consumer/citizenfocused. Both practical but narrow.
Non-Profit / Social Services	Tools for caregivers, social services. Strength: good workflows, local resource integration. Weakness: some too simplistic.	None represented in Open category.	SG only -showing maturity of civil society adoption.

Table 6

Strengths and Gaps of Apps created across Dimension

Dimension	Evidence of Strength	Evidence of Gaps
Knowledge	Basic GenAI fundamentals, responsible cues (hotlines, local frameworks)	Shallow context; U.S.-centric sources
Skills	Strong CoT use, structured logic (esp. students)	Weak iteration among professionals
Tools	Effective rapid prototyping	Limited feature use, weak UI/UX
Processes	Isolated high-quality apps	Minimal workflow integration, safety failures
Culture	Students' bold creativity, professionals' domain caution	Imbalance between risk-taking and risk-aversion