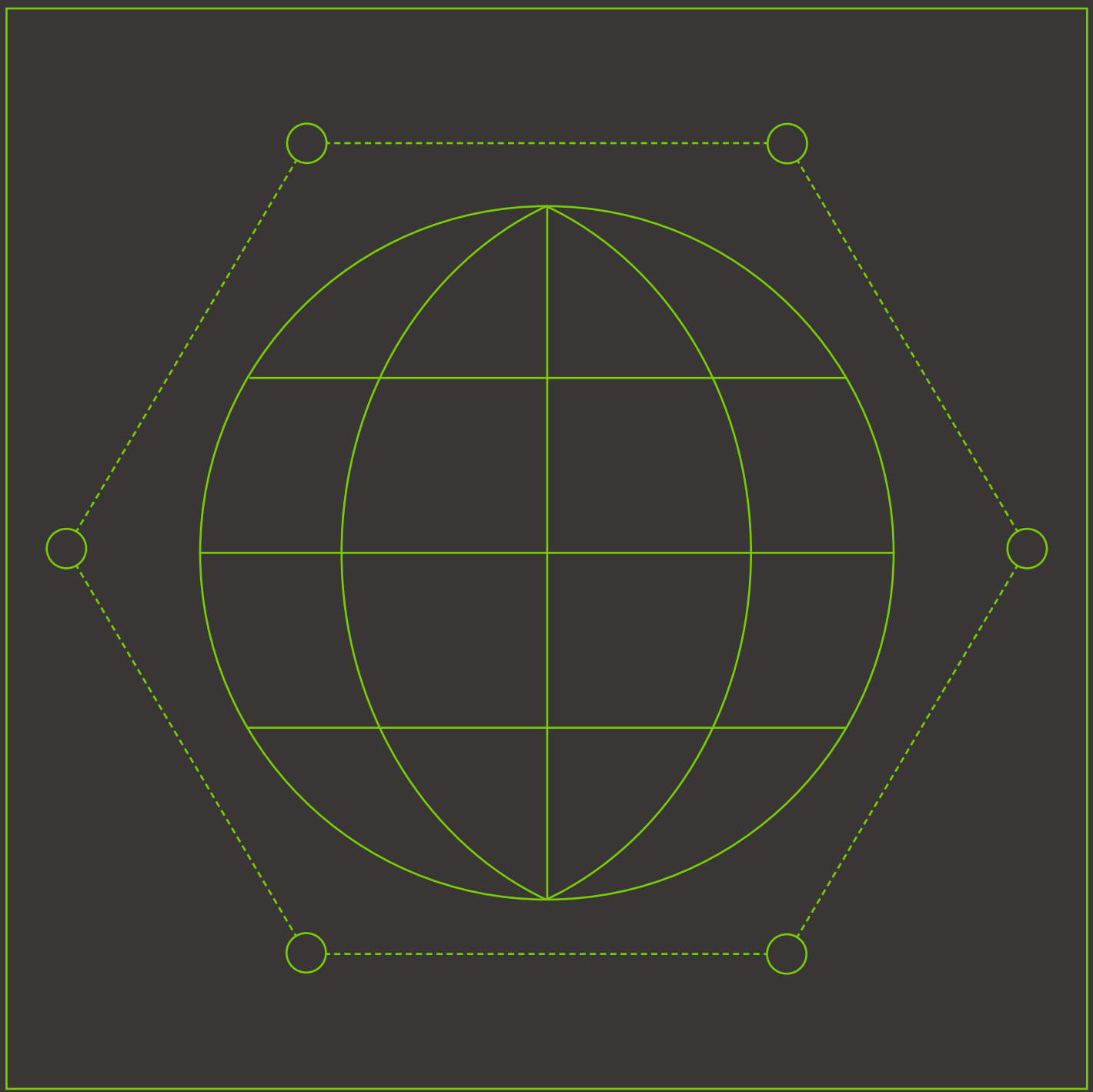
AI in Business Education Spotlight Series

AI in Business Education

Nanyang Business School

Graduate Management Admission Council™



GMAC's AI in Business Education case study series spotlights the integration of artificial intelligence in graduate management education, focusing on curriculum development, administrative processes, and strategic applications.

Nanyang Technological University (NTU), based in Singapore and home to Nanyang Business School, is a research-intensive public university with over 35,000 undergraduate and postgraduate students. The institution is regularly ranked among the top in Asia for business education and counts among the leading universities worldwide for engineering and technology. The university's vision is to build an institution founded on science and technology with a strong emphasis on using digital technology and tech-enabled solutions to enhance productivity and learning outcomes. As part of its broader institutional goals, the NTU aims to integrate artificial intelligence (AI) tools into various aspects of its teaching, research, and administration, helping prepare students for a technology-driven future.

Nanyang Business School is recognized as a key driver of the university's innovative approach to integrating generative AI (GenAI) into the learning experience, equipping students with both practical skills and a strong understanding of how GenAI functions. NTU promotes a decentralized and entrepreneurial environment that encourages experimentation, while at the same time allowing faculty to submit proposals for funding to scale up successful pilots.

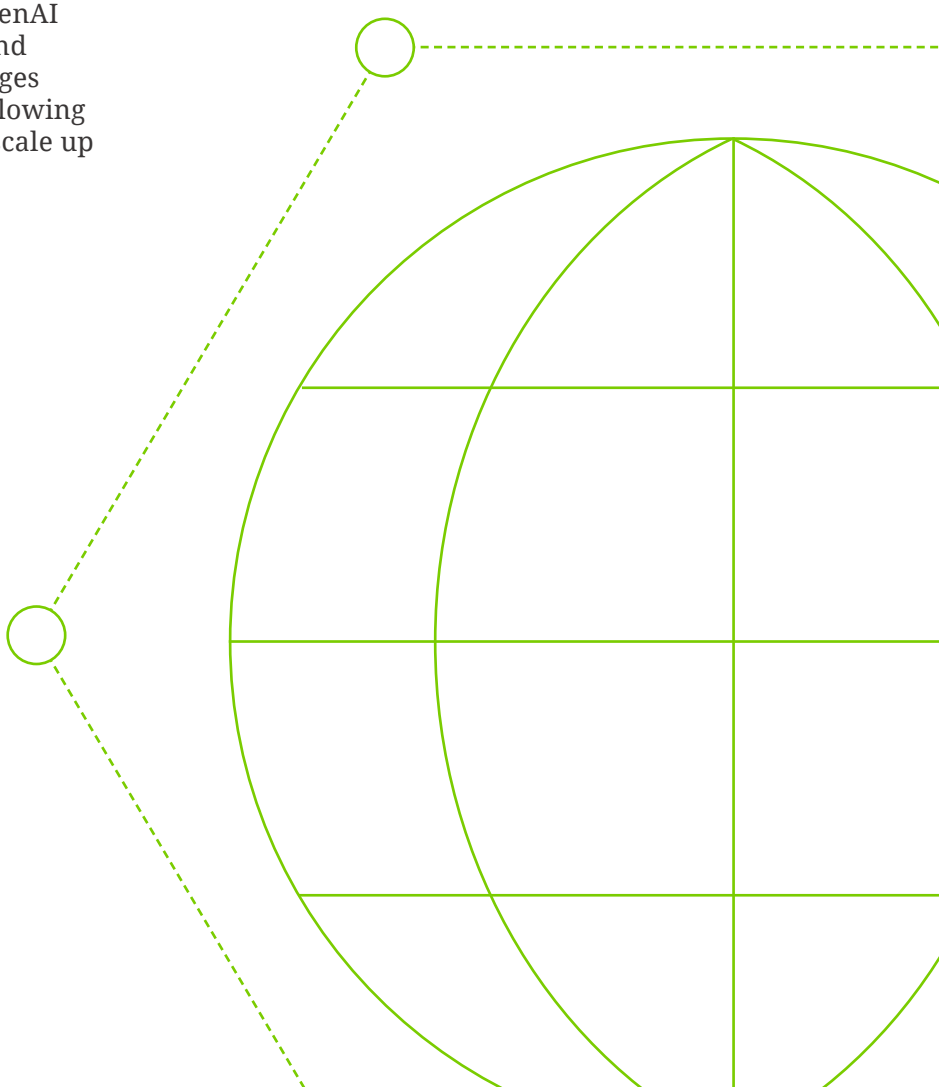
A summary of success

The Context:

A forward-thinking institutional framework that prioritizes innovation and integration across disciplines. With a clear mandate to enhance both productivity and learning outcomes, NTU fosters an experimental and collaborative culture that encourages the exploration of generative AI among faculty, students, and staff.

The Innovation:

Nanyang Business School supported a pilot project to redesign curricula and learning assessments to embrace generative AI tools. Combining theoretical pedagogical frameworks with AI technology, the project asked students to conduct a case study with GenAI prompts co-designed with faculty, then assess the different results with their peers.



Strategy and planning

Within this framework, Dr. Kumaran Rajaram, senior lecturer of leadership, Management Organisation, designed a three-step approach to embedding GenAI within a curriculum and assessment phase aimed at fostering higher-order thinking skills.

1. **Pre-class, individual preparation of a GenAI prompt**
2. **In-class, group collaboration and discussion of results**
3. **Post-class, individual analysis of discussion and prompt outputs**

In undertaking this pilot, Prof. Kumaran acknowledged the key challenge—while GenAI is already significantly impacting learning processes, outcomes, and assessment outcomes, there is limited empirical research on the effectiveness of assessment designs in a GenAI-driven learning environment. Therefore, the pilot project was designed to allow teaching staff to experiment with traditional curriculum designs and redefine learning outcomes while monitoring the impact of GenAI.

"The whole idea of this project is transformation—rethinking pedagogical design in light of generative AI. We aim to foster higher-order thinking by guiding students through deliberate, structured problem-solving with AI tools. It's not just about giving answers; it's about challenging students to analyze, evaluate, and synthesize information critically. While the pilot was experimental, it gave us valuable insights to refine the process. With proper funding, we plan to scale this and create a robust framework that integrates AI meaningfully into education."

Dr. Kumaran Rajaram
Senior Lecturer, Leadership, Management Organisation

Framing the project

Imagine a scenario where background reading is being condensed and summarized by the latest GenAI models, where students are no longer doing their own internet searches for information but relying on AI-generated reports—with the quality of response varying based on their ability to create a prompt rather than their topical knowledge. Case studies and assignment topics are being processed by large language models without expert oversight or guidance (or care for IP rights). None of this needs too much imagination, as it is already happening away from the view of lecturers.

Now imagine a scenario where students are not just using GenAI but are deliberately and transparently exploring the impact of different prompting techniques to understand biased or suboptimal perspectives on the same case study, under the watchful eye of their lecturer. Where students bring their unique insights to class for critical discussion with peers to build a cohesive understanding of the problem and are required to submit for assessment a comprehensive analysis of the multiple perspectives explored during group work. Students are encouraged to consolidate their learning and evaluate the effectiveness of their different approaches to and prompting of GenAI, and the identification of improvements.

AI implementation

At its most fundamental level, this project tests how to introduce, design, and develop an assignment in a GenAI-powered learning environment. The project aimed to transparently, and in partnership with students, show that a GenAI-oriented curriculum design could promote better learning outcomes and, specifically, higher-order thinking skills.

The core assignment was divided into three stages:

1. Pre-class, individual preparation
Students engaged in preparatory work for a case study assignment using prompts for ChatGPT that were co-developed with faculty and tuned to provide varied perspectives. The learning design notion of "deliberate, guided failure" was adopted, where working with sub-optimal representations allowed students to explore the problem and increase their awareness of knowledge gaps.

2. In-class, group collaboration
Groups of up to five students, each having prepared using the different co-developed prompts, then discuss the different results and argue to achieve consensus on the best output using the "jigsaw" learning design principal.[1]

3. Post-class, individual analysis
Students were required to make sense of the group discussions advocated from multiple directions.

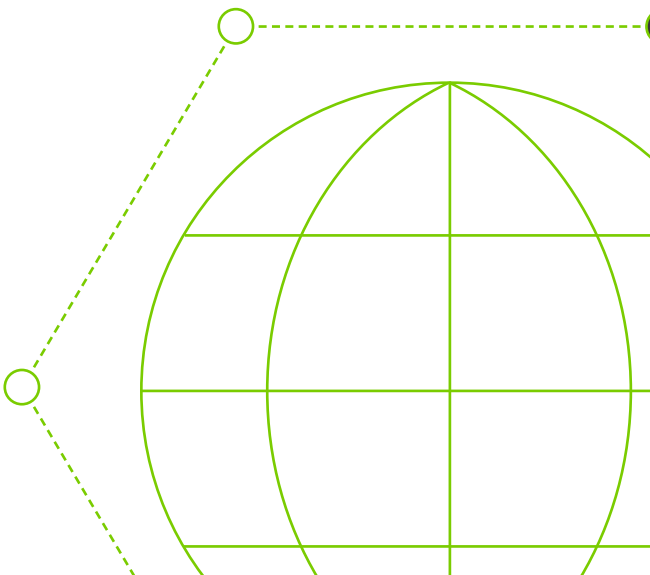
In addition to enabling students to understand the impact of small variations within prompting on the outcome of research, the method specifically aimed to enable students to critically assess GenAI outputs by comparing them with traditional sources, identifying errors, and presenting results with sound reasoning and an evidence-based approach. (Figure 1).

The initial project was rolled out for approximately 600 undergraduate and postgraduate students across more than a dozen classes each semester primarily at the business school, with multiple lecturers providing a broad set of results for analysis and future development.

1 "This cooperative-learning reading technique gives students the opportunity to specialize in one aspect of a topic, master the topic, and teach the material to group members."
"Jigsaw." The Teacher Toolkit. https://www.theteachertoolkit.com/index.php/tool/jigsaw.

Figure 1. Rubrics to assess and measure higher order thinking skills (as the learning outcomes) (Adapted from Bloom's Taxonomy, 1956, 2001)

	Minimal	Moderate	Advanced
Individual Based Assessment			
Question and prompt	Student does not adequately question the relevance, reliability, authority, and purpose. There is minimal or no relevant promoting.	Student moderately questions the relevance, reliability, authority, and purpose. There is some evidence of relevant, multifaceted promoting.	Student actively and deliberately questions the relevance, reliability, authority, and purpose. There is evidence of quality, relevant, multifaceted promoting.
Team Based Assessment			
Analyze	Students do not examine most of the ideas and information. They minimally or do not consider the aspects of a problem and do not look at the elements in its context.	Students moderately examine ideas and information. They somewhat consider aspects of a problem and look at some elements in its context.	Students carefully examine ideas and information. They systematically consider all aspects of a problem and look at each element in its context.
Evaluate	Students minimally or do not recognize and go through the process of reasoning. They minimally or do not compare different viewpoints, arguments and point out strengths and weaknesses.	Students moderately recognize and somewhat go through the process of reasoning. They fairly compare different viewpoints, arguments and point out strengths and weaknesses.	Students recognize and go through the process of reasoning holistically. They compare different viewpoints, arguments and point out strengths and weaknesses.
Synthesis	Students minimally or do not use logic and reasoning to formulate arguments and conclusions. They use minimal or no evidence-based analysis and evaluation to support conclusions.	Students minimally or do not use logic and reasoning to formulate arguments and conclusions. They use minimal or no evidence-based analysis and evaluation to support conclusions.	Students use good logic and quality reasoning to formulate arguments and conclusions. They use strong evidence-based analysis and evaluation to support conclusions.



Challenges and solutions

1. Resource constraints

Initial pilots were conducted using free versions of ChatGPT, which on the one hand had the benefit of mimicking the existing use of GenAI by students, but also limited customization and scalability. There was a lack of funding for advanced AI tools, which restricted the ability to fully test and deploy custom GPT models. Running early pilots of innovative projects at low cost enables the university to explore many options before deciding where to invest in scaling successful initiatives.

2. Prompt design

Developing effective prompts for generating meaningful AI outputs required significant effort and expertise. The initial variations in prompts that were co-designed with students were often too narrow or too different to compare results. To simplify and standardize the process, future classes will be provided with a pre-approved set of prompts designed by the lecturer.

3. AI limitations

The reliance on generative AI introduced risks such as hallucinated information and inconsistencies. Ensuring students could critically evaluate and validate AI-generated outputs was both a challenge and a core element of the assessment design.

4. Student adaptation

Some students, particularly those from technical/engineering backgrounds, struggled with open-ended, ambiguous tasks that required higher-order thinking, preferring binary, clear-cut answers. Management and leadership courses require rational and evidence-based reasoning, which are less straightforward.

The future of AI at NTU

The future of AI at NTU focuses on transforming education, enhancing productivity, and driving innovation. The leadership at Nanyang Business School envisions the integration of AI tools across teaching, learning, and administration, aligning with its strategic goal of preparing students for a technology-driven world. Customized AI solutions are expected to play a significant role, offering the ability to adapt and scale the university's unique offering to suit future careers that interact with GenAI. Projects like the AI-powered learning assessments will expand, incorporating ever more complex GenAI models to scale impactful pedagogical strategies across various disciplines.

Nanyang Business School aims to refine the use of AI in assessments, focusing on promoting critical thinking, analysis, and synthesis. This involves scaling pilot projects and incorporating AI tools into mainstream curricula while maintaining a student-centric approach. Students and faculty will be supported in the use of AI for problem-solving and creativity, ensuring they are equipped to navigate complex professional environments. The institution also plans to streamline its operations through AI-driven solutions, such as automated grading, course planning, and administrative support.

Additionally, the institution will explore AI's potential in research, marketing, and student engagement. Investments in data infrastructure and security will ensure robustness, while collaboration with industry will further strengthen NTU's ability to pioneer innovative applications of AI in education.

In the long term, NTU aspires to be a leader in AI-powered education, showcasing its success through global partnerships. By embedding AI into its core strategy, NTU seeks to redefine education and institutional efficiency while maintaining an innovative learning environment.

"At the institution level, there's definitely a big push to use AI to improve productivity for all. We're already piloting AI-driven assessment tools in engineering and discussing how to integrate them into business school courses. The goal is not to replace creativity but to enhance it, enabling students to work smarter and focus on higher-order thinking. It's about training them to use AI to increase productivity while we, as educators, adopt these tools to refine our own processes."

Prof. Sharon Ng
Professor and Deputy Dean, Nanyang Business School

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