

# InsPIRE Insight

## From Insights to Impact: An Agentic Learning Intelligence Framework for Student-Centred Success

By

Joel Weijia Lai, Wei Qiu & Fun Siong Lim

Centre for the Applications for Teaching & Learning Analytics for Students (ATLAS)

under the Institute for Pedagogical Innovation, Research & Excellence

Nanyang Technological University

Singapore

### KEY IMPLICATIONS

- Agentic AI enables personalized, adaptive, and proactive learning pathways that evolve with students' goals and performance.
- Integrating AI-powered analytics across academic, career, and co-curricular domains promotes holistic student development.
- Effective implementation requires careful data governance, system interoperability, and student trust in AI recommendations.

### BACKGROUND

The integration of artificial intelligence (AI) in higher education has largely focused on predictive learning analytics such as identifying students at risk and recommending interventions. However, such systems can be reactive, relying on past data and without considering evolving learner aspirations. This initiative redefines AI's role from passive analysis to agentic intelligence—autonomous systems that guide, adapt, and support students in shaping their own learning journeys. This practitioner's report responds to a growing demand for student-centered, lifelong learning approaches aligned with dynamic career pathways through the integration of big data with agentic AI.

### FOCUS OF INITIATIVE

The Agentic Learning Intelligence Framework developed at Nanyang Technological University (NTU) seeks to operationalize AI as an active partner in students' educational growth. It integrates five institutional data hubs (Curriculum, Education, Career, Library, and Student Academic Hubs) through an AI Orchestrator that synthesizes data and provides tailored recommendations on learning resources, skill-building, and career opportunities. This approach shifts from an institutional-centric to a student-agency model, where learners can set goals, choose how often they receive AI recommendations, and engage with AI agents that dynamically adapt pathways to their academic progress, engagement, and aspirations.

### KEY OUTCOMES

Previous works report these outcomes:

- At-risk dashboard: Implemented across six cohorts ( $\approx 14,000$  students), predictive models achieved over 70% accuracy in identifying at-risk students, improving academic outcomes through early interventions.
- Career preparation platform: An AI-powered tool enabling skill profiling and internship matching enhanced students' self-awareness of competencies and career readiness.

These previous works will be integrated to develop a scalable architecture connecting multiple learning and career hubs via an AI Orchestrator, capable of delivering personalized, real-time recommendations to support lifelong learning.

## SIGNIFICANCE OF OUTCOMES

*Implications for practice:* The framework demonstrates how learning analytics can be reimagined as a student empowerment tool rather than an institutional monitoring mechanism. Faculty and advisors can use AI insights to guide individualized learning and career planning, improving teaching effectiveness and learner engagement.

*Implications for policy:* The study underscores the need for data governance and interoperability policies in higher education to support AI-enabled personalization while safeguarding privacy and transparency. It also advocates for institutional strategies promoting cross-departmental data sharing to enable holistic student support.

*Learning gains:* Previous works indicated that early intervention improved student GPAs, while the career readiness platform enhanced skills awareness and alignment with industry needs. Students reported greater motivation and clarity in academic and professional goal setting.

*Proposed follow-up activities:*

1. Pilot agentic AI implementation within one college and one hub at NTU to test scalability.
2. Establish training programs to help faculty and students interact effectively with AI systems for personalized learning.

## METHODOLOGY/APPROACH

The proposed agentic framework (see Figure 1) uses distributed AI agents for each data hub, coordinated by an AI Orchestrator that synthesizes recommendations and maintains privacy through distributed data governance. This report does not mention exact methodology and approach as these remain proprietary information. It will be released as the development work progresses.

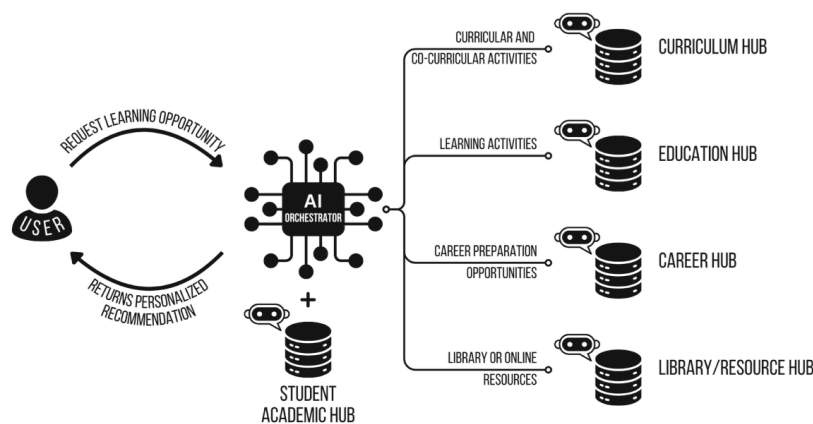


Figure 1: Overview of agentic AI system.

## References

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Link to full article (if available): [https://doi.org/10.1007/978-3-031-99261-2\\_10](https://doi.org/10.1007/978-3-031-99261-2_10)  
Contact Fun Siong Lim at [lim\\_fun\\_siong@ntu.edu.sg](mailto:lim_fun_siong@ntu.edu.sg) for more information about the initiative.