80&Co.

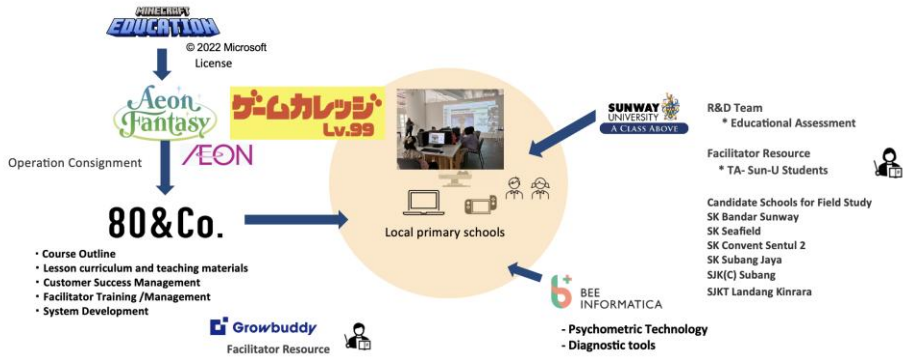
Design and Validation of a Diagnostic Model for Developing 21st Century Skills in Malaysian Children Utilizing Game-Based Learning

Objective of the project

This project aims to design and validate an educational model that fosters and visualizes 21st-century skills—the 4Cs—among primary-school children in Malaysia through game-based learning (GBL) using Minecraft Education. By combining the psychometric tool "4CsGram" with behavior-observation assessments to form a dual-assessment framework, we established quantitative and qualitative methods for evaluating non-cognitive abilities in classroom settings and carried out pilot trials with a view to scaling the model across Malaysia and other ASEAN countries.

Cooperation with local companies/governments

80&Co. jointly developed its GBL content and a diagnostic tool for measuring 21st-century skill acquisition with Bee Informatica, and—supported by Growbuddy and Sunway University—conducted pilot trials in local Malaysian primary schools. The participating organizations subsequently collaborated to analyze the collected data and carry out diagnostic evaluations.



Targeted economic/social issues

In today's global economy where environmental change driven by rapid advances in AI and automation is accelerating, 21st-century skills such as Critical Thinking, Creativity, Collaboration, and Communication (the 4Cs) are viewed as essential to the competitive strength of societies and businesses alike. According to the QS Global Employer Survey 2018 and other public sources, there is a marked shortage of precisely these skills, exposing a serious mismatch between the needs of employers and the skills and capabilities supplied by the talent pipeline, and addressing this gap has become an urgent priority.

The OECD likewise calls for the systematic cultivation and quantitative assessment of the 4Cs (largely non-cognitive in nature), yet primary-level curricula in many countries, including Malaysia, still rely heavily on rote learning. Although the decade-long initiative of Malaysia Education Blueprint 2013–2025 acknowledges the importance of the 4Cs, systems for developing and evaluating them in primary schools remain underdeveloped. Its implementation is further hindered by urban-rural disparities in ICT infrastructure and variations in teachers' digital education skills.

On top of these issues, learning gaps rooted in the nation's multi-ethnic, multilingual context as well as the isolation and learning loss exposed by the COVID-19 pandemic demand prompt, effective solutions. Expectations are therefore high for initiatives that can address these intertwined challenges.

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Demonstration period

January 2024 – May 2025

Details of demonstration

Over a 13-month span, 80 & Company, Growbuddy, Bee Informatica, and Sunway University ran a full research cycle—from literature review and pilot to large-scale delivery and analysis—of the Dream Home Project in Minecraft Education. The program reached 636 pupils across six Malaysian primary schools and used a dual-assessment design consisting of the psychometric tool, 4CsGram and systematic behavioral observation. Student teaching assistants supported the classes, while additional devices and interpreters reduced technical and language hurdles.

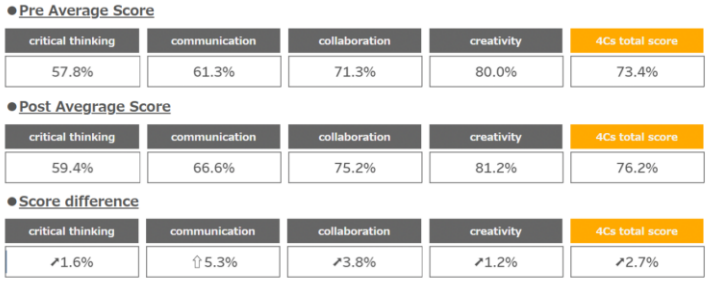
Paired-sample testing on valid pre/post data (N=306) of 4CsGram showed a significant overall rise in 21st-century skills, $t(306) = 7.72$, $p < 0.05$, driven by ”Communication” (+5.3%) and ”Collaboration" (+3.8%). During behavioral observation, numerous instances of cooperative work, proactive suggestions, and creative thinking were recorded, and positive changes were also observed in behavioral observation indicators. Complementary trait-based profiling clustered pupils into ten skill types—e.g., "flexible explorer" and "team player"—and mapped their distribution by school and grade.
The results validated game-based learning as an effective route to measurable 4Cs growth and provided actionable insights for tailoring instruction and refining classroom management.

Project outcome / Future plans

This project, although it was a short-term intervention, demonstrated statistically significant gains in pupils' 21st-century skills (4Cs), confirming that the dual-assessment approach—combining 4CsGram with behavioral observation—successfully makes non-cognitive growth visible. Every participating school and grade level showed improvement, underscoring the transferability of a standardized GBL session. On the other hand, outcomes were also affected by external factors, such as limited ICT infrastructure and insufficient language support, highlighting the need to strengthen operational systems.
Next steps:

1. Commercialize the service through annual contracts with local schools.
2. Launch a facilitator-training business in partnership with Sunway University and others.
3. Roll out the model to other ASEAN countries, beginning with Indonesia and Thailand.

Furthermore, including multilingual support for 4CsGram and integration with AI and other technologies for individualized learning optimization, we aim to contribute to continuous learning support and evidence-based educational reform.



● Pre Average Score

critical thinking	communication	collaboration	creativity	4Cs total score
57.8%	61.3%	71.3%	80.0%	73.4%

● Post Avegrage Score

critical thinking	communication	collaboration	creativity	4Cs total score
59.4%	66.6%	75.2%	81.2%	76.2%

● Score difference

critical thinking	communication	collaboration	creativity	4Cs total score
↗1.6%	⇧5.3%	↗3.8%	↗1.2%	↗2.7%

⭐ Score analysis using 4CsGram (summary)