Cultivating 21st Century Talent:
Reshaping Hong Kong's Public K-12 Education for a Technology-Enabled Future

Project Report | Hong Kong Young Leaders Programme 2024

HONG KONG YOUNG LEADERS PROGRAMME

GIFT GLOBAL INSTITUTE FOR TOMORROW.

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Executive Summary (1/3)

Reshaping Hong Kong's Public K-12 Education for a Technology-Enabled Future

The future is increasingly complex and unpredictable, driven by different factors including the rapid emergence of groundbreaking technologies. For Hong Kong to establish itself as an international Innovation and Technology Hub (I&T Hub) in alignment with the city's developmental vision, success will hinge on cultivating a strong pool of talented professionals who possess **foresight, complex problem-solving skills, and competencies such as resilience**.

The city's chronic talent shortage indicates a need for the K-12 education system to adapt in order to develop competent graduates. This report proposes a revitalisation of the public K-12 education system, with a central theme of enhancing students' technological readiness for the future. The three key policy recommendations include:

1. **Effective 21st Century Learning:** To equip students with the necessary skills to thrive in the 21st Century, and to move away from the teacher-centred pedagogical approach that may result in passive learning.
   - ***Students*** **- Implementing project-based learning (PBL):** Introduce PBL as a core component of the curriculum through a progressive 6-year implementation across all K-12 schools in Hong Kong. This timeline will facilitate buy-in from both students and teachers, thereby enhancing their confidence in fully adopting PBL within the curricula.
   - ***Teachers*** **- Building PBL teaching capacity:** Equip educators with the facilitation skills and dynamic teaching methodologies essential for the PBL pedagogical approach. Comprehensive support will include a revitalisation of standards and training programmes, such as the teacher certification curriculum (PGDE/BEd) and the professional development standards ("T-Standard"), to ensure that educators are adequately prepared to implement PBL effectively.

2. **Paradigm Shift in Assessment:** To transition from a solely knowledge-based, exam-orientated assessment model towards a more holistic assessment approach, focusing on students' competency and soft skills development.
   - **Competency-based Assessment**: Develop a competency-based assessment system within the curriculum from Primary 1 (P.1) to Secondary 6 (S.6), focused on 21st Century skills and PBL.
   - **Continuous Assessment:** Realign the HKDSE score weighting to enhance the significance of continuous assessment, rewarding skill progression and development rather than placing a sole emphasis on final outputs.
   - **Learning & Teaching Evaluations:** Strengthen the breadth and coverage of learning and teaching performance evaluations, ensuring that appraisal feedback are connected to teachers' professional development.

Executive Summary (2/3)

Reshaping Hong Kong's Public K-12 Education for a Technology-Enabled Future

3. **Upgrading the STEAM* Education Infrastructure:** To provide systematic professional development for teachers and facilitate the real-life application of STEAM knowledge by establishing a long-term school-industry infrastructure.
   - **Empower Schools with On-Site STEAM Specialist:** A STEAM specialist that is distinct from teachers, with an integral role in advancing PBL and STEAM methodology, certified by local universities, to be introduced in each primary school and secondary school for the enhancement of STEAM's integration across different subjects.
   - **Establish STEAM Training Centres in Universities**: Establish dedicated STEAM Training Centres in selected universities to provide STEAM education to all teachers and to develop STEAM specialists based on their professional goals and career stages.
   - **Introduce Collaborative Digital Platform - "*CODES*"**: Leverage the Business School Partnership Programme (BSPP) to introduce a digital platform via a new statutory body – *CODES (Collaborative Opportunities for Development in Education and STEAM)* – to enhance STEAM education by fostering collaboration among K-12 schools, higher education institutions, education technology (Ed-tech) companies, and industry partners.
   - **Management & Operation of the *CODES* Statutory Body**: Implement compulsory school-industry partnerships by integrating at least one PBL course with an industry partner into the curriculum for S.4-S.5 students, positioning the *CODES* statutory body as the central body for facilitating these partnerships.
   - **Integrate GBA resources into *CODES***: Integrating Great Bay Area (GBA) resources into the *CODES* platform through a cross-border Government-Enterprise STEAM scheme, to foster collaboration with GBA stakeholders to provide mentorship and resources for STEAM* education, and encourage students to participate as STEAM ambassadors.

STEAM* = Science, Technology, Engineering, Arts, Mathematics

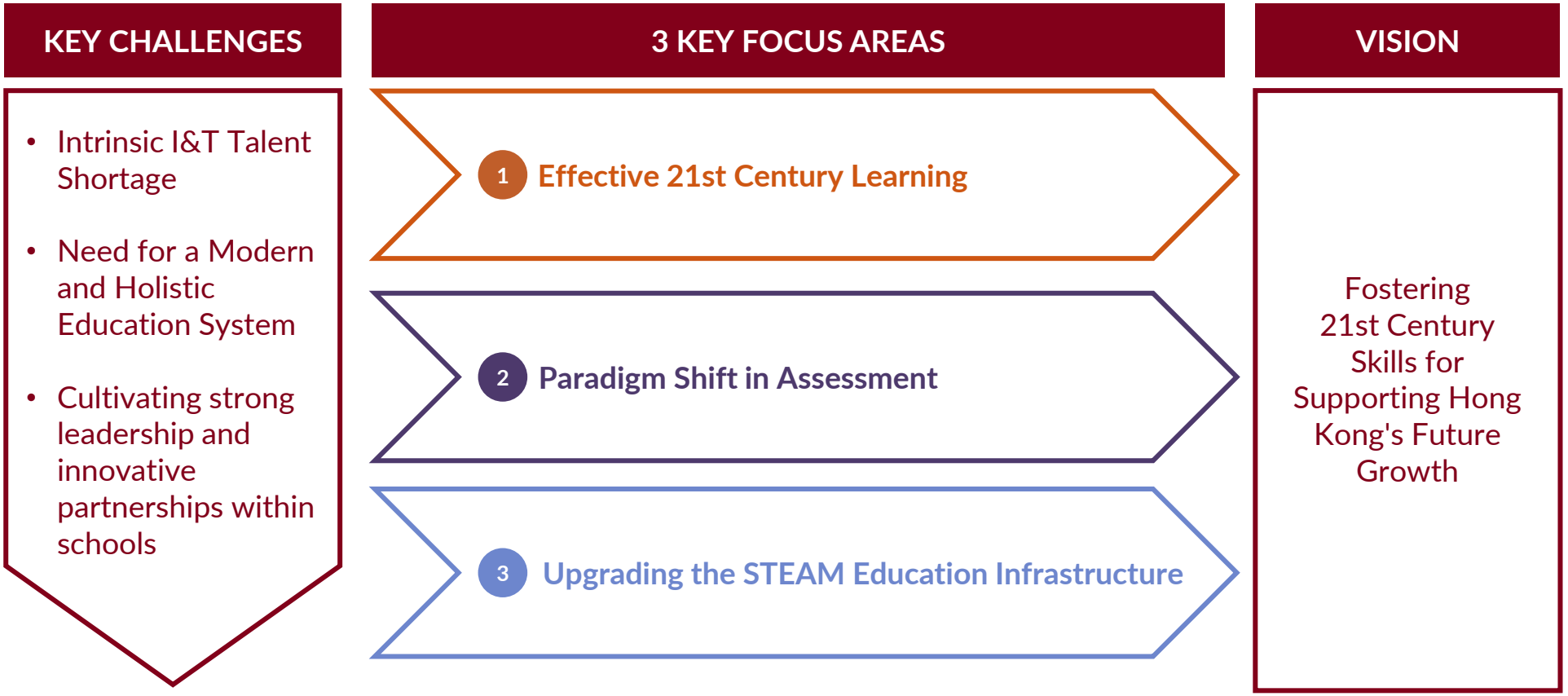
Limitations: Areas Beyond Project Scope

The Hong Kong K-12 education system is an immensely complex and sophisticated ecosystem, involving significant and influential stakeholders that this report should examine and address, though they are beyond the scope of this proposal. For example, while ***parental expectations*** often align with university admission standards (such as HKDSE), these standards do not align with industry needs. Additionally, there is a critical need to alleviate ***non-teaching-related workloads for teachers***.

Nevertheless, this proposal aims to ignite a spark among the community of stakeholders in the education sector and beyond, encouraging them to continue empowering the next generation and generating innovative ideas for the future.

Executive Summary (3/3)

The following policy recommendations are centred on **three Key Focus Areas: *Effective 21st Century Learning*, *Paradigm Shift in Assessment*, and *Upgrading the STEAM Education Infrastructure***. The following diagram illustrates how this policy proposal relates to the current challenges, and the roadmap for achieving the **Vision: Fostering 21st Century Skills to Support Hong Kong's Future Growth**.



Introduction of the Hong Kong Young Leaders Programme 2024

GIFT

The Hong Kong Young Leaders Programme

HONG KONG YOUNG LEADERS PROGRAMME

The Global Institute For Tomorrow (GIFT) is an independent pan-Asian think tank, committed to purposeful leadership learning and partnering with clients to help them unlearn conventional wisdom and unleash organisational potential to redesign society.

The Hong Kong Young Leaders Programme (HKYLP) is GIFT's experiential leadership programme designed for a tri-sector cohort from government, leading companies, and civil society organisations to think critically about the drivers of change in the 21st century and develop new policies and innovations that address the defining challenges of our time.

During this HKYLP, 19 participants convened in Hong Kong in November and December 2024 to undertake classroom discussions, stakeholder meetings, and policy development sessions. The highlights of this proposal were presented at a Public Forum on 13 Dec 2024, which was attended by stakeholders from the educational sector, industries, NGO practitioners, and parents.

Project Team

The participants were identified as rising talents by their organisations. They come from businesses, the Hong Kong government, and civil society organisations. The cohort's professional profile is diverse, with roles including Chief Operating Officers, Barristers, Senior Managers, Senior Officers, and Senior Researchers.

PARTICIPATING ORGANISATIONS

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香港青年協會領袖學院 The HKFYG Leadership Institute

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Supporting Organisations & Sponsors

Successful completion of the project would not have been possible without the support we received from our supporting organisations in arranging experts' sharing, site visits, and stakeholder interviews. We also wish to thank our generous sponsors who enabled deserving candidates from NPOs to take part in this unique leadership development opportunity. We would like to extend our heartfelt gratitude to all of these organisations and individuals that have supported the growth and development of Young Leaders in Hong Kong:

SPONSORS

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Project Background

Hong Kong's Current Situation

"We have a 19th century curriculum taught by 20th century teachers to 21st century students."
- John Tsang, Founder of Esperanza

Among the 3.7 million employed individuals in Hong Kong, approximately 28% work in "high-risk" sectors where there is a 70% likelihood that their jobs could be replaced by artificial intelligence within the next 10 to 20 years, affecting around 1 million people. Additionally, 18% of jobs are classified as being in high-risk areas. Conversely, in low-risk sectors, the likelihood of jobs being "intelligentised" is less than 30%. This rapid evolution highlights the critical need for students to engage with technology and prepare for future employment opportunities.

High-Risk Jobs Include: Cashiers, Couriers, Accountants, Auditors, Other roles involving manual operations and procedures

Jobs Less Likely to Be Replaced by Intelligent Technology Include: Artists, Researchers, Journalists, Data Analyst

Jobs less likely to be replaced by intelligent technology demand higher levels of creativity and social intelligence, as well as strong management and negotiation skills. In 2023, the World Economic Forum highlighted the ***Essential 21st Century skills***: **Critical thinking, creativity, collaboration, communication, emotional intelligence, adaptability, digital literacy, leadership, initiative, and cultural awareness**.

Hong Kong I&T Blueprint

The 14th Five-Year Plan for Hong Kong's I&T Development

Hong Kong is to be transformed into an international technology hub under the *"Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2035."* This plan emphasises Hong Kong's need to enhance its competitive advantages in China, integrating into the overall development of the country, and deepening cooperation with the Mainland in innovation and technology.

Hong Kong I&T Blueprint: Four Main Development Directions

1. **Enhancing the I&T ecosystem** and promoting "new industrialisation" in Hong Kong
2. **Enlarging the I&T talent pool** to create strong impetus for growth
3. **Promoting digital economy development** and developing Hong Kong into a smart city
4. **Proactively integrating into the overall development of China** and consolidating Hong Kong's role as a bridge connecting the Mainland China and the world

Advancing Hong Kong's I&T Blueprint and the city's strategic positioning requires a modernised and comprehensive education infrastructure.

Key Challenges

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Key Challenges (1/2)

Intrinsic I&T Talent Shortage

The government estimates that by 2028, Hong Kong will face a labour shortage of 180,000 workers, with a significant portion — approximately one-third — designated for "skilled technical workers."

Year	Local Labour Force	Manpower Shortage
2023	3.5 million	50,000
2028 (Forecast)	3.56 million	180,000

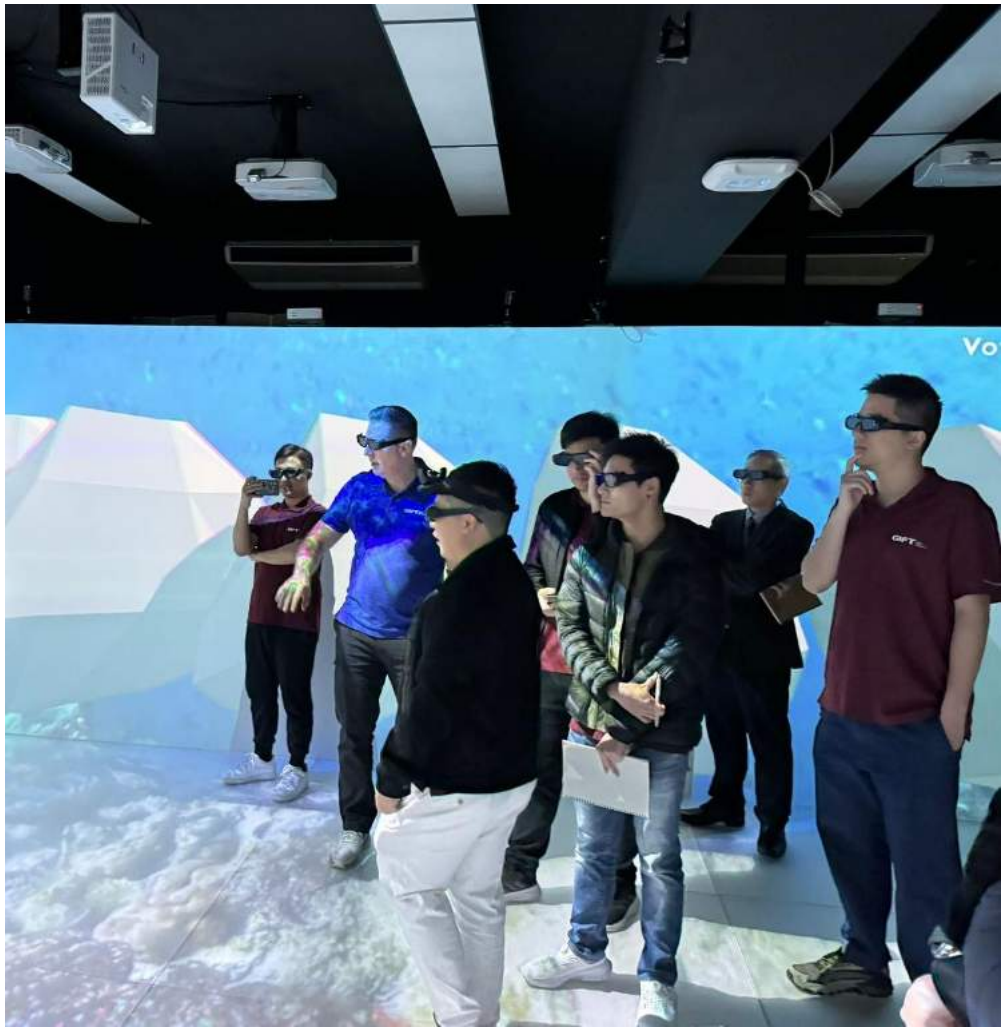
*HKSAR Press Release 14 Nov, 2024

The Hong Kong student population dropped from ~886,000 in 2013/14 to ~790,000 in 2023/2024.

Year	2013/14	2018/19	2023/24
No. of Students	886,000	871,000	790,000

*HKCSD 2024

Apart from labour import, it is of utmost importance to nurture and develop local talents to support Hong Kong's competitive standing and future growth, and to ensure a sustainable transformation into an international I&T hub.



Key Challenges (2/2)

The Need for a Modern and Integral Education System

The Curriculum - The current education system, encompassing both curricula and assessments, primarily emphasises **hard skills that are rooted in the industrial age**. This focus does not adequately address the modern and future needs of the information age, which demands **an expanded set of competencies and soft skills** that are essential for students to adapt to a world of fast-developing technology.

The Teachers - Most teachers today were trained during the 1980s and 1990s, a period when technology in education was minimal and job market demands were significantly different. As a result, many teachers still lack the necessary skills and tools to teach effectively in a tech-heavy world. The gap in equipping teachers with the **knowledge of contemporary methods and technologies** limits their ability to engage students effectively.

The Infrastructure - The educational infrastructure could benefit from enhanced **collaboration among key stakeholders**. There are opportunities to strengthen the **connections between schools, the commercial sector, and civic society**. Improved cooperation can lead to a more integrated and therefore effective approach to education, which is essential for equipping students with the skills they need to thrive in a rapidly changing landscape.

"Search Engines have been my primary source when designing the STEAM curriculum for my students."
- A primary school teacher at an aided school in the North District

Based on experts sharing during the Hong Kong Young Leaders Programme 2024

Site Visit Observations

Schools in Hong Kong with limited resources face significant challenges in updating their curricula to meet evolving demands. This situation is particularly acute in schools with low student populations at risk of closure.

At one primary school, **a proactive principal** enhanced education through **innovative partnerships**. Notably, securing a collaboration with Nike that sponsored and supported the renovation of the school's sports ground with recycled shoe materials. The principal also secured funding from the Quality Education Fund for a LEGO@Education initiative as part of STEAM learning for students. These partnerships were self-initiated by a **committed and well-connected principal**.

Similarly at one secondary school, the principal outreaches to collaborate with *Ednovators*, an NGO dedicated to inspiring educators and transforming education through teacher upskilling and cross-sector partnerships. The school partnered with a corporation to develop a coding and AI syllabus, where **students applied their knowledge to create elderly-friendly furniture**. Another initiative to foster **engagement between schools, industry, and community** featured a gym equipped with special bicycles; a charity would subsidise electricity bills for local elderly residents when students meet their cycling targets. Additionally, students engage in caring for endangered species and cats at the school, promoting environmental stewardship and responsibility.

At another primary school, despite heavy workload, **a teacher takes up the role to coordinate STEAM curriculum design**, actively researching and integrating STEAM practices into their lesson plans.

These examples highlight the critical role of strong leadership and innovative partnerships in overcoming structural challenges, to enable a more enriching learning experience of students in Hong Kong.

Limitations: Areas Beyond Project Scope

It is important to recognise two influential stakeholders that significantly impact the educational landscape yet fall outside the scope of this report:

1. **Universities** – Universities play a crucial role in shaping the education system, as most K-12 schools—along with their teachers and principals—tend to guide students toward pursuing higher education. Consequently, university admissions criteria significantly influence schools in their student assessments, teacher evaluations, and curriculum design. To effectively contribute to the development of students' 21st century skills and competencies, **universities should take the lead in reshaping their curricula and admission standards, which in turn will cascade to the schools.**

2. **Parents** – Influenced by deeply ingrained perceptions of success that pertained to their own times, parents often guide students toward traditional educational pathways, such as attending K-12 schools that align with university admission standards. This focus frequently results in an educational experience that emphasises rote learning and conventional subjects, which may inadequately prepare students for the skills and competencies needed in the future workforce. **To shift parental perceptions of success, it is essential for educational and industry stakeholders to work on redefining the *meaning of talent*, and this can only be achieved through long-term generational evolution in attitudes and values**.

The Impacts on effective STEAM education

This alignment between parental expectations and university admission standards often leads students to pursue traditionally "successful" disciplines, such as finance and medicine, that overshadow the importance of other fields of study, including STEAM. The prevailing educational practices, combined with cultural and societal pressures, inadvertently hinder the growth of the STEAM industry, limiting opportunities for innovation and creativity in an increasingly technology-driven world.

A holistic approach that values diverse fields of study, including STEAM, along with robust support for teachers, is essential for cultivating a vibrant and innovative educational environment. Achieving this requires collaboration among all stakeholders to address fundamental challenges effectively.

Vision & Focus

The Vision

Vision Statement: All Hong Kong Form 6 graduates will be equipped with essential **21st century skills** empowering them to thrive in a technology-enabled future. This should be achieved through **innovative teaching methods** and the integration of **cross-sectoral resources**.

Vision of a student profile upon graduating from the K-12 System:

Problem-solving skills

Resilience and Integrity

Creativity & Innovation

Critical Thinking Skills

A growth mindset to reflect, improve & adapt

IT literacy & Mathematical skills

Be able to hold oneself accountable

A competent team player (collaboration skills)

Ability to learn independently and effectively

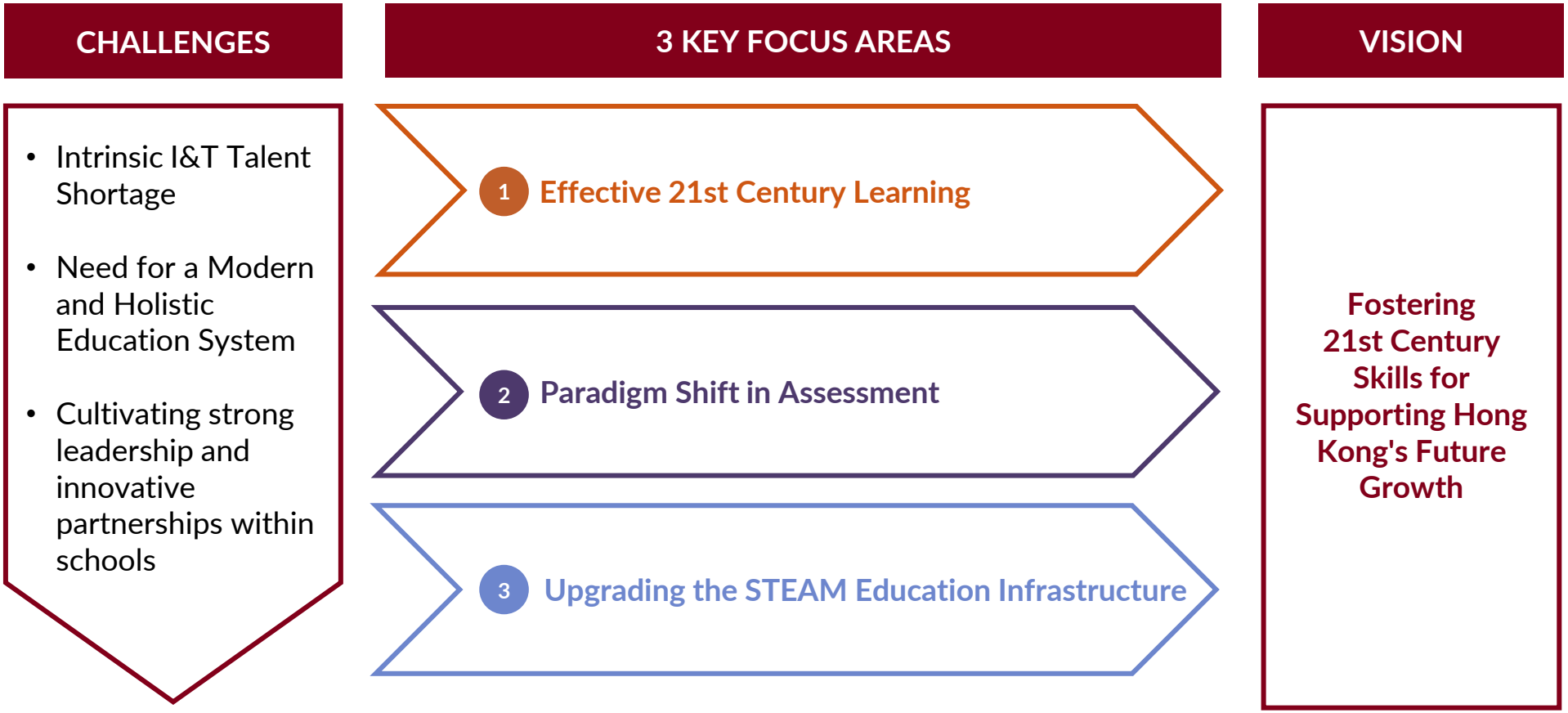
Work productively by utilising technology

Communication skills

Empathy & Social awareness

Key Focus Areas

The following policy recommendations are centred on **three Key Focus Areas: (1) *Effective 21st Century Learning*, (2) *Paradigm Shift in Assessment, and (3) Upgrading the STEAM Education Infrastructure***. The team's policy recommendations within each of these key focus areas aim to address the current challenges identified. They ultimately support the team's vision for Hong Kong's public K-12 education system, which is to **Foster 21st Century Skills to Support Hong Kong's Future Growth**.



3 Key Focus Areas

1. Effective 21st Century Learning

Modernise the curriculum to incorporate **project-based learning (PBL)**, **interdisciplinary approaches**, and **creative problem-solving**. Ensure teachers possess the contemporary skills needed to prepare students for future challenges.

2. Paradigm Shift in Assessment

Support the STEAM curriculum by developing **comprehensive qualitative assessment rubrics** that accurately evaluate and cultivate relevant skills and qualities in both teachers and students.

3. Upgrading the STEAM Education Infrastructure

Establish a sustainable ecosystem that offers comprehensive support and **utilisation of resources for STEAM** education, **promoting long-term collaboration** among the government, all K-12 schools, educational institutions, and industry stakeholders.

Focus Area 1:

Effective 21st Century Learning

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Focus Area 1: Effective 21st Century Learning

Background and Challenges

There is an urgent need for modernisation in the Hong Kong education system to better equip students with the essential skills required to succeed in a rapidly evolving technological landscape.

CURRENT SITUATION

Project-Based Learning (PBL) represents a relatively low weighting in current students' overall learning experience and assessments.

- Approximately 30% of secondary schools in Hong Kong have integrated PBL into their curriculum in some form.
- On average, PBL accounts for about 10-15% of the overall assessment in schools that have adopted it.
- Studies have shown that around 70% of students participating in PBL report higher engagement and motivation compared to traditional learning methods.

Sources: Education Bureau Statistics, Study on PBL Implementation , SLITS Project Observations

Examples of PBL implementation in other countries

- **Mainland China:** In 2022, the Chinese government initiated a reform for compulsory education, mandating that **all subjects incorporate 10% of classroom time** dedicated to PBL.
- **USA:** Research from the University of Southern California and Michigan State University has demonstrated **a positive correlation between PBL and higher passing rates in Advanced Placement courses**, specifically in Environmental Science and U.S. Government and Politics.

CHALLENGES

- The existing examination-oriented system in Hong Kong places **greater emphasis on test scores than on the comprehensive development of students**. This approach inhibits the cultivation of students' creativity and critical thinking skills.
- The current implementation of Project-Based Learning (PBL) is predominantly **centred on individual subjects instead of encouraging interdisciplinary learning**. This approach limits the effectiveness of PBL in promoting real-life application of knowledge and skills, which are crucial for student success in a complex, technologically advanced world.
- The teaching method in classrooms is stagnant and remains a **teacher-centred approach**, which relegates students to the role of **passive learners**. To maximise the effectiveness of PBL, it is imperative that teachers receive additional training to enhance their ability to facilitate and guide students to develop essential **21st Century Skills**, such as critical thinking, innovation, collaboration, adaptation, real-world problem-solving skills etc.

Background and Challenges

Top 10 in-demand skills projected for 2027 from The World Economic Forum's Future of Jobs 2023 report

The World Economic Forum's Future of Jobs 2023 highlights the importance of both **cognitive and interpersonal skills** in the future job market. It finds creative thinking, analytical thinking, and AI and big data to be the top in-demand skills by 2027. **Interpersonal skills** such as leadership, social influence, curiosity, and lifelong learning are among other skills expected to see growing demand.

World Economic Forum. (2024, April 30). *The Future of Jobs Report 2023*. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf

Policy Recommendations to Address the Challenges

In response to the evolving demands of 21st century education driven by technological advancements the following policies are proposed:

Policy 1.1: Project-Based Learning (PBL) as a Core Component of the Curriculum

PBL is a teaching and learning method that simulates real-world problem-solving scenarios. Integrating PBL into interdisciplinary subjects will effectively foster essential 21st century cognitive and interpersonal skills.

PBL focuses on real-world applications encourages students to utilise technologies such as artificial intelligence (AI), virtual reality (VR), and coding as problem-solving tools, mirroring the skills needed in the future workforce and ultimately preparing students to be future-ready.

Policy 1.2: Build PBL Teaching Capabilities

All K-12 teachers should receive support along different stages of their career development, enabling them to effectively educate and prepare students for the expectations of the future workforce.

Four key teaching capabilities are identified as essential for a successful PBL curriculum:

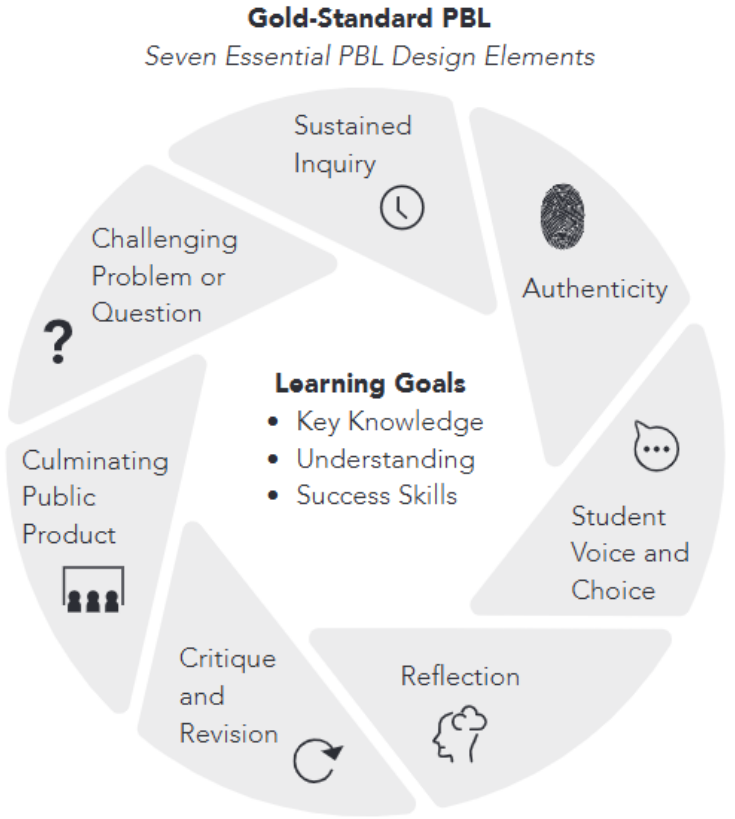
- **Facilitation skills**
- **Growth mindset**
- **Qualitative assessment** of students' abilities, and
- **Integration of technology** into traditional learning methods.

1.1 Project-Based Learning (PBL)

Policy Recommendation #1.1:
Project-Based Learning (PBL) as a Core Component of the Curriculum

To achieve Policy Recommendation #1.1:

- Implement PBL learning according to the framework proposed by Sever (2022), **transitioning from subject-based to interdisciplinary approaches** starting at the primary level.
- Require all secondary schools to participate in **industry-school partnership programmes**, with at least one company or NGO advisor to assist in school-based PBL curriculum design.
- Implement a **6-year timeline for the adoption of PBL in all K-12 schools** in Hong Kong. This timeline will allow educators' buy-in and acquisition of the necessary skills and knowledge for effective PBL delivery, while also engaging stakeholder from industries and civil society to build the societal support for PBL's implementation in classrooms.



Sever, B. (2022). Sustainable Project-Based Learning: Five Steps for Designing Authentic Classroom Experiences in Grades 5–12 (An instructional framework for developing ongoing project-based learning tasks and units). In *Solution Tree* (1st ed.). Solution Tree Press.

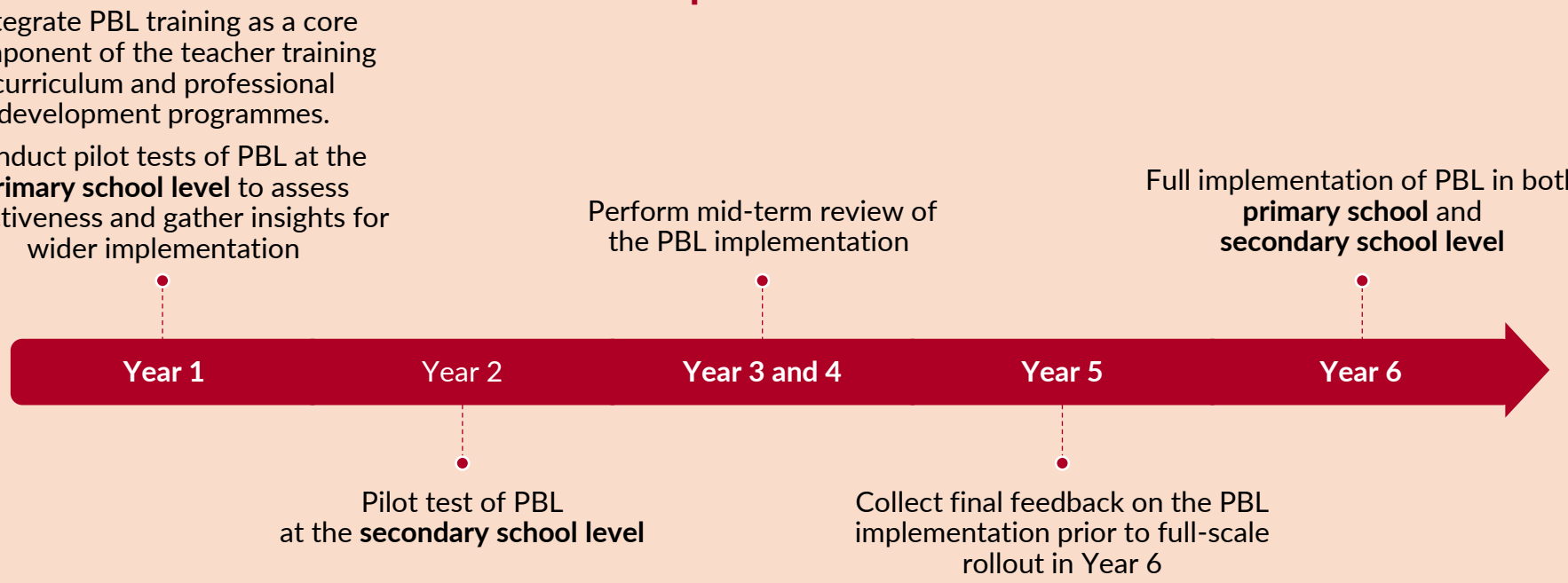
1.1 Project-Based Learning (PBL)

Policy Recommendation #1.1:
Project-Based Learning (PBL) as a Core Component of the Curriculum

Phased Implementation of PBL in 6 Years

A proposed **6-year implementation timeline** for PBL in Hong Kong public schools. This timeline is designed to foster greater engagement among students, teachers, and the broader community. It aims to cultivate an understanding of the value of PBL within the curriculum, and to build confidence and skills for implementation among all stakeholders.

6-Year PBL Implementation Timeline



1.1 Project-Based Learning (PBL)

Policy Recommendation #1.1:
Project-Based Learning (PBL) as a Core Component of the Curriculum

A Student's Education Journey with PBL

Primary P1 - P6

- Every primary school is required to host **a yearly PBL initiative across Maths, Science, Technology, and Art** for all primary students. This will expose students to a collaborative learning environment focused on real-world problems, preparing them for PBL in secondary school.

Secondary S1 - S3

- PBL will be mandated across the subjects of Maths, Science, Technology, and Arts to provide students with a well-rounded interdisciplinary experience
- Allocate **24 lessons per year for all junior secondary students** to engage in PBL
- Schools will have the flexibility to **customise PBL units** based on their students' needs, community contexts, and an advisors assigned by industry-school partnership programmes
- Ensure that these lessons are distributed throughout the academic year to allow adequate time for inquiry, collaboration, and reflection.

Secondary S4 - S5

- Allocate **12 lessons per year for senior secondary students** to engage in PBL
- The assignment results from PBL will be counted as **School-based Assessment (SBA)*** in the DSE

**SBA is an evaluation method where students are assessed by their own teachers within their school environment.*

Industry Engagement is required for the effective design and implementation of PBL in Secondary School

1.2 Build PBL Teaching Capabilities

Policy Recommendation #1.2:
Equip current and future teachers with PBL teaching capabilities

All K-12 teachers will be upskilled with PBL teaching capabilities so that they can efficiently **educate, facilitate, and foster students** with respect to expectations of future workforce.

Four Key PBL Teaching Capabilities:

1. Act as a **facilitator** to nurture students' curiosity & ability to learn
2. **Emphasis on qualitative assessment of students' ability** instead of only quantitative measures
3. Adapting **a growth mindset** to constantly seek improvement and upskill their teaching knowledge
4. Promote **using technology & AI in parallel with traditional learning**

1.2 Build PBL Teaching Capabilities

Policy Recommendation #1.2:
Equip current and future teachers with PBL teaching capabilities

1

Teacher training institutes and universities are required to update the PGDE and BEd curricula annually to reflect the evolving needs of industries. They must provide the updated curriculum to the Education Bureau (EDB) **each year** for review and alignment.

Background: In Hong Kong, Section 42 of the Education Ordinance stipulates that any person who teaches in a school must meet one of the following criteria:

1. **Registered teacher**
   - Holds a recognised teaching qualification, such as a Bachelor of Education (BEd) or a Postgraduate Diploma/Certificate in Education (PGDE).
2. **Permitted teacher**
   - Holds only academic qualifications and does not possess formal teacher training or qualification.
   - Must be supported by the school supervisor.

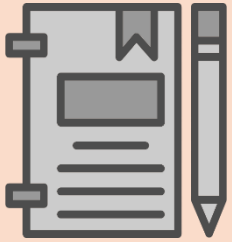
Recommendation: To align with the rapid changes in our technological society and the increasing importance of Project-Based Learning (PBL) in the curriculum, teacher training institutions and universities must **update the curricula of their PGDE and/or BEd programs annually**. This update should include mandatory integration of PBL and, preferably, experiential learning as core subjects to meet the evolving trends and needs of industries.

These institutions are required to submit a formal report to the Education Bureau (EDB) each year detailing the curriculum updates.

1.2 Build PBL Teaching Capabilities

Policy Recommendation #1.2:
Equip current and future teachers with PBL teaching capabilities

2



Update the "T-Standard" for teachers to place greater emphasis on developing facilitation skills that empower teachers to guide students in thinking, conversing, and actively participating in the learning process. Additionally, **provide mandatory training and guidance on PBL** to ensure effective implementation in classrooms.

Background: The **"T-standard+" established by the Education Bureau (EDB) outlines the goals for teachers' professional development, founded on three core elements of professional growth:**

1. Professional competencies
2. Professional values and conduct
3. Aspiration for self-advancement through self-reflection

For the **Enhanced Training for In-Service Teachers**, the current target is for each teacher to complete a soft target of 150 hours of training within every three-year cycle.

Recommendation: To equip all teachers with the skills necessary to facilitate and guide students in PBL, training focused on developing **facilitation skills and PBL implementation** is essential. This training will include workshops led by educators experienced in PBL.

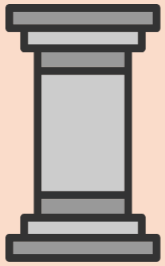
All teachers are required to:

1. Attend mandatory core PBL training for 10 hours in the first year
2. Complete a 6-hour refresher course every subsequent year
3. Achieve completion of a PBL course within 6 years to align with the PBL implementation schedule

1.2 Build PBL Teaching Capabilities

Policy Recommendation #1.2:
Equip current and future teachers with PBL teaching capabilities

3



Launch **exchange programmes and industry visits for teachers** to gain insight into how various schools implement education with technology. This initiative will enable them to apply these insights to their own teaching practices, enhancing their effectiveness and adaptability in the classroom.

Background: The **Scheme on Hong Kong Teachers' Exchange Activities with the Mainland** has been co-organised by the Ministry of Education of the People's Republic of China, the Department of Education of Guangdong, and the EDB since the 2009/10 school year. This initiative aims to establish a professional platform for exchange and promote mutual professional development among teachers in both regions. In 2012, the Scheme was incorporated into the Framework Agreement on Hong Kong/Guangdong Co-operation.

In the 2022/23 school year, there are approximately 29,586 secondary school teachers (including principals) and 27,407 primary school teachers (including principals) in Hong Kong.

Recommendation: It is recommended to **expand the programme**, allowing about 10% of teachers to participate in exchange activities and visit schools in the Mainland that exemplify best practices in Project-Based Learning (PBL). Teachers who attend these visits will bring back ideas to further develop their own schools. Given the large number of teachers, the first round of visits covering this 10% will be conducted over a period of five years.

Focus Area 2:

Paradigm Shift in Assessment

GIFT

Focus Area 2: Paradigm Shift in Assessment

Background & Challenges

There is widespread agreement in the education sector that **effective assessment methodologies** are crucial for evaluating the quality of teaching and learning. Assessment methodologies encompass feedback mechanisms, student engagement, and the identification of gaps between students' current competencies and expected growth. With the integration of **Project-Based Learning (PBL)** into the curriculum, it is essential to **re-evaluate current assessment methods** to better accommodate the cognitive and interpersonal skills that define the 21st century student profile.

CURRENT SITUATION

- Most existing assessments in primary and secondary schools rely on traditional methods, such as grading of tests and examinations.
- In **secondary schools**, the curriculum mandates a fixed portion of assessment to be allocated to **continuous assessment** for Forms 1-3; however, there is **no standardised assessment tool or framework** in place. As a result, schools have complete autonomy in designing their assessments.
- For **senior secondary students (Forms 4-6),** local schools primarily focus on the local examination (HKDSE), resulting in relatively **low emphasis on continuous assessment**.

CHALLENGES

- The current assessment system primarily evaluate students' performance under examination conditions, often overlooking other essential skills and competencies.
- In the absence of **alignment and top-down directives**, continuous assessment may devolve into simplistic project work that fails to effectively evaluate students' soft skills and overall capabilities. As a result, such projects are unlikely to **measure the soft skills vital for success in the 21st century**.
- Despite the government's effort to encourage schools to adopt more **formative assessment practices** – such as class discussions, peer reviews, assignment, etc. – to enhance teaching and learning, current assessment practices remain primarily focused on summative evaluation. This lack of alignment with PBL risks perpetuating the examination-oriented curriculum.

Policy Recommendations to Address the Challenges

In response to the evolving demands of 21st century education driven by technological advancements, the following policies are proposed to modernise both the method (competency-based) and structure (weighting) of assessments:

Policy 2.1: Introduce Structural Competency-based Assessment as Part of the Curriculum

Revamp curriculum across all levels from P.1 to S.6 by reducing examination-based assessments and replacing with competency-based assessments.

Policy 2.2: Continuous Assessment in Public Examinations

Redesign the HKDSE system and grading requirements to shift the focus away from only exam-oriented academic skills to a continuous assessment of 21st century skills required to thrive in a technology-enabled future.

Policy 2.3: Implement Learning and Teaching Evaluations

Evaluation of PBL learning outcomes and teaching performance to assess the efficiency, effectiveness, and direction of learning.

2.1 Competency-Based Assessment

Policy Recommendation #2.1:
Introduce structural competency-based assessment in the curriculum across all levels from P.1 to S.6

To better support the new PBL-based curriculum and provide more effective assessments for students, the introduction of **competency-based assessment** is proposed across all levels, from Primary 1 to Secondary 6. This new assessment method will balance the focus on students' soft skills alongside summative assessments, putting weight on the assessment of students' soft skills such as the ability to construct and apply knowledge in projects.

Weighting

Competency-based assessment shall **account for at least 50% of the marks** for each subject throughout the entire course from P1-S6.

Targeted Design

The assessment structure shall be designed with rubrics that are aligned with, and targeted at, the PBL-based curriculum, emphasising the development of students' soft skills.

Supporting Teachers

With the proposed modernisation of teacher training in Section 1.2, teachers will be well-equipped to design and implement effective competency-based assessments within a school-based setting.

Focus Area 2: Paradigm Shift in Assessment

2.1 Competency-Based Assessment

Policy Recommendation #2.1:
Introduce structural competency-based assessment in the curriculum across all levels from P.1 to S.6

Benefits of Competency-Based Assessment

Holistic Evaluation

Competency-based assessments consider various aspects of student performance, including cognitive, emotional, and social development, offering a more holistic view of their abilities that **address the soft skill requirement in the 21st century**.

Individualised Feedback

Teachers can offer personalised feedback that is specific to each student's needs, promoting targeted support and **encouraging lifelong growth for students.**
Students are also encouraged to reflect on their own work and learning strategies, **fostering critical thinking and self-awareness.**

Flexibility

Competency-based assessments can be adapted to different projects, making them versatile tools **for a curriculum based on PBL.**

Promotes Continuous Improvement

These assessments provide ongoing insights that can be used to **continuously improve teaching strategies** and student learning outcomes.

Reduces Test Anxiety

Since competency-based assessments are less formal and often integrated into daily activities, with suitable support, they can help reduce students' anxiety compared to traditional examinations, hence **promoting emotional health for students.**

2.2 Continuous Assessment in Public Exams

Policy Recommendation #2.2:
Targeted assessment methods along the student learning ladder with increasing weighting on SBA

- With the **vision to develop 21st century skills among students** from primary to secondary school, and the renewed curriculum emphasis on PBL, it is essential to introduce targeted assessment methods during the different stages of a student's learning ladder.
- In addition to academic knowledge, the HKDSE assessment methods should be expanded to measure students' achievements of 21st century competencies and skills. At the **secondary school level 4-5 (S.4-5)**, the results of PBL will be assessed through a **School-Based Assessment (SBA)** and become a key component of the Hong Kong Diploma of Secondary Education (HKDSE) results. The SBA is an evaluation method where students are assessed by their own teachers within their school environment.
- A **balanced assessment system** to be introduced in **secondary school level 6 (S.6)** to reduce the heavy emphasis on final examinations.

STUDENT LEARNING LADDER

Primary P.1-6	Secondary S.1-3	Secondary S.4-5	Secondary S.6
Building Stage	**Development Stage**	**Practice Stage**	**HKDSE/Bridging to Further Education**
Annual PBL assessment across STEAM subjects	**Integrating STEAM with 24 PBL lessons in each academic year**, allowing schools to customise based on needs and contexts.	The assignment results of the PBL via **School Based Assessment (SBA)** will be accounted for in the DSE results.	A **balanced assessment system** to evaluate both students' academic knowledge and 21st century competencies and skills

2.2 Continuous Assessment in Public Exams

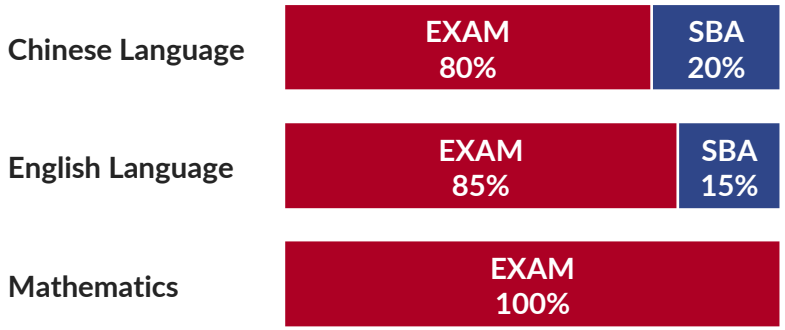
Policy Recommendation #2.2:
Targeted assessment methods along the student learning ladder with increasing weighting on SBA

The limitations of current HKDSE

- The HKDSE is the public examination for secondary school students in Hong Kong, attended by over **43,000** (~93%)** Form 6 students graduating in 2024.
- The HKDSE currently places a **heavy emphasis on final examinations**, with varying contributions from School-Based Assessments (SBA) depending on the subject.
- This system primarily evaluates students' ability to perform under exam conditions, **potentially overlooking 21st century skills*** that include competencies required to approach complex challenges and changing environments, e.g. problem-solving, creativity, communications, initiative and adaptability .

Current Score Weights in HKDSE^

- **Examinations**: Typically account for **at least 80%** of the final score in most subjects.
- **School-Based Assessment (SBA)**: Varies by subject, generally contributing a small percentage to the final score.
- **Examples**:



Source: ^SBA, HKEAA Hong Kong Examinations and Assessment Authority - School-based Assessment (SBA) - Subject Information on SBA
**21st Century Skills, World Economic Forum Ten 21st-century Skills Every Student Needs | World Economic Forum*
*** Registration Statistics, HKEAA https://www.hkeaa.edu.hk/en/media/facts/facts.html*

2.2 Continuous Assessment in Public Exams

Policy Recommendation #2.2:
Targeted assessment methods along the student learning ladder with increasing weighting on SBA

Background: There is a growing demand for a more balanced and holistic assessment system that not only evaluates academic knowledge but also nurtures essential skills for the future. The proposed target is for all candidates of HKDSE across all disciplines to be assessed based on **a blended approach that combines examinations and school-based assessment (SBA)** to be implemented within 10 years' time.

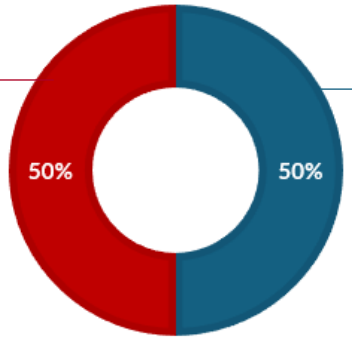
Recommendations:

1. **Equal Weighting:** Implement a **50% Examination** and **50% School-Based Assessment (SBA)** weighting for all subjects.
2. **Uniformity Across Subjects:** This new weighting system is applied consistently across all subjects, evaluating both academic knowledge, competencies, and skills. The implementation will be phased to ensure a smooth transition.
   - **Phase 1:** Adoption of new weighting system for **core subjects**, such as Chinese, English, and Mathematics over a period of **five (5) years.**
   - **Phase 2:** Adoption of the new weighting system for **elective subjects** also over a **five (5) year** period. This phased approach allows for careful monitoring and adjustments, ensuring that the new system effectively enhances student learning and assessment.

Recommended Assessment Structure

EXAMINATIONS (50%)

- Current assessment method to evaluate students' **academic knowledge and understanding of subject content.**



SCHOOL-BASED ASSESSMENTS (50%)

- **Cognitive Skills:** Encourage in-depth exploration of topics, fostering research and analytical skills, e.g. project work.
- **Interpersonal Skills:** Develop communication and public speaking abilities, e.g. producing and delivering presentations.
- **Project Skills:** Evaluate hands-on skills and real-world application of knowledge, e.g. practical assessments.

2.2 Continuous Assessment in Public Exams

Policy Recommendation #2.2:
Targeted assessment methods along the student learning ladder with increasing weighting on SBA

Allows space for students' development in creative expression, innovative thinking, critical thinking and adaptability, as well as technological proficiency through projects and research. These are essential for preparing students to thrive in the future dynamic job market.

Fosters a **cultural shift in schools and among parents on the examination-oriented mindset**, emphasising the importance of diverse skills and continuous learning.

Holistic Evaluation:
A comprehensive evaluation of students' academic knowledge, competencies and practical skills.

Progressive Assessment:
A structured system that responds to students' learning progression, setting targets for both hard and soft skills throughout their educational journey.

Inclusive Assessment:
A recognitionion of diverse competencies apart from academic knowledge. All students may succeed regardless of their learning styles, needs, and capabilities.

2.3. Learning and Teaching Evaluations

Policy Recommendation #2.3:
A modernisation of the evaluations of learning outcomes and teaching performance

Source: Gold Standard Project Based Learning by PBLWorks is licensed under CC BY-NC-ND 4.0

Rationale & Background

- To properly understand the effectiveness of the implementation of a PBL curriculum, a **comprehensive rubric** is required to systematically evaluate the performance and areas of improvement for students and teachers.
- **Current practice of PBL evaluation** primarily focuses on assessing project outputs, while it is rare to continuously track the progressive development of students' competencies and skills.
- **Teaching performance evaluation and appraisal** are conducted in the form of lesson observation and book-checking. This is a summative assessment and there are no systematic feedback mechanisms for teachers to reference for their own development.

Recommendations

- In response to the introduction of PBL in the curriculum, it is proposed to **infuse the PBL** paradigm and principles in **evaluating the progressive skills development** of students and the **facilitation proficiency** of teachers.
- Specifically, adopting the **competency-based assessment** can shift performance evaluations for **students and teachers** into **a source of motivation** for skills improvement and alignment.

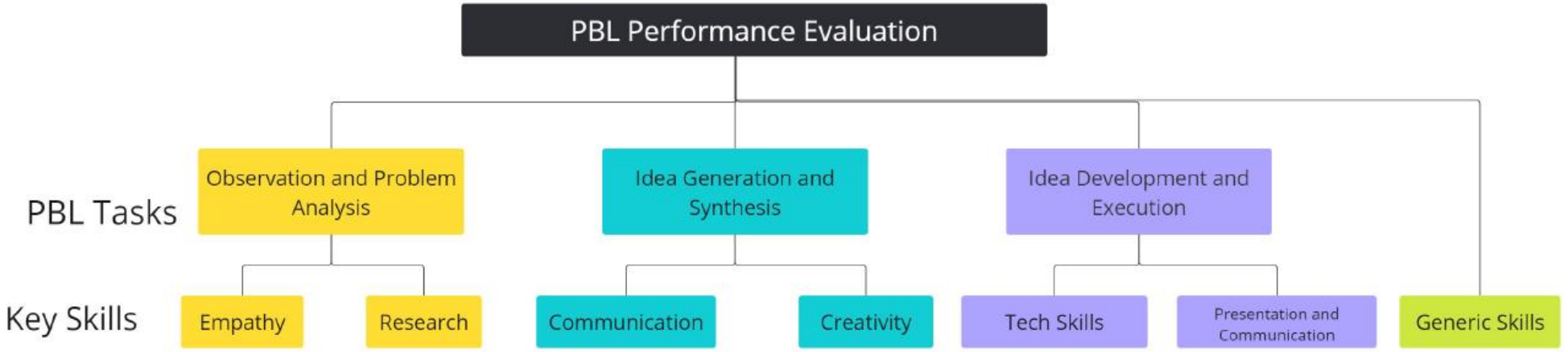
2.3. Learning and Teaching Evaluations

Policy Recommendation #2.3:
A modernisation of the evaluations of learning outcomes and teaching performance

Implementation of PBL Performance Evaluation Framework

- A framework for evaluating student performance and progress in PBL is proposed based on findings from the University of Hong Kong (HKU) and the Hong Kong Polytechnic University (PolyU) (Chan, 2009; PolyU, 2022).

- This framework encompasses three main components of grading: **(1) Observation and problem analysis; (2) Idea generation and synthesis;** and **(3) Idea development and execution**. Each component will include a detailed rubric outlining specific tasks and criteria, along with systematic tracking and feedback mechanisms to assess students' 21st-century skills effectively.



Source: Chan C.(2009) Assessment: Problem-Based Learning, Assessment Resource Centre, University of Hong Kong [http://arc.cetl.hku.hk]: Available: Accessed:12/12/2024

Jockey Club Design Institute for Social Innovation (2022) An Open Assessment Rubrics for Maker Project in Education [https://soinnohub.polyujcsoinno.hk/wp-content/uploads/2023/06/An-Open-Assessment-Rubrics-for-MAKER-Project-in-Education_e-version.pdf]: Available: Accessed: 12/12/2024

2.3. Learning and Teaching Evaluations

Policy Recommendation #2.3:
A modernisation of the evaluations of learning outcomes and teaching performance

Examples of project-based learning and competency-based assessment rubrics for students:

CATEGORY	4	3	2	1
Contributions	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard.	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussi... refuse t...
Time-management	Routinely uses time well throughout the project to ensure things get done on time. Group does not have to adjust deadlines or work responsibilities because of this person's procrastination.	Usually uses time well throughout the project, but may have procrastinated on one thing. Group does not have to adjust deadlines or work responsibilities because of this person's procrastination.	Tends to procrastinate, but always gets things done by the deadlines. Group does not have to adjust deadlines or work responsibilities because of this	Rarely g... done by deadline... group has to adjust deadlines or work responsibilities because of this person's inadequate time management.
Problem-solving	Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.		
Focus on the task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.		
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.		
Preparedness	Brings needed materials to class and is always ready to work.	Almost always brings needed materials to class and is ready to work.		

Attitudes and Behaviours

Task Performance

Skills Demonstration

- Future assessment rubrics will be designed and regularly updated based on Key Learning Areas and Intended Learning Outcomes.
- Students' performance will be evaluated on their ability to learn and demonstrate outcomes, rather than on just the preparation typical of traditional assessments.

Source:

- Jockey Club Design Institute for Social Innovation (2022) An Open Assessment Rubrics for Maker Project in Education [https://soinnohub.polyujcsoinno.hk/wp-content/uploads/2023/06/An-Open-Assessment-Rubrics-for-MAKER-Project-in-Education_e-version.pdf]: Available: Accessed: 12/12/2024
- Holotracker (2024). Retrieved from https://holotracker.org/

2.3. Learning and Teaching Evaluations

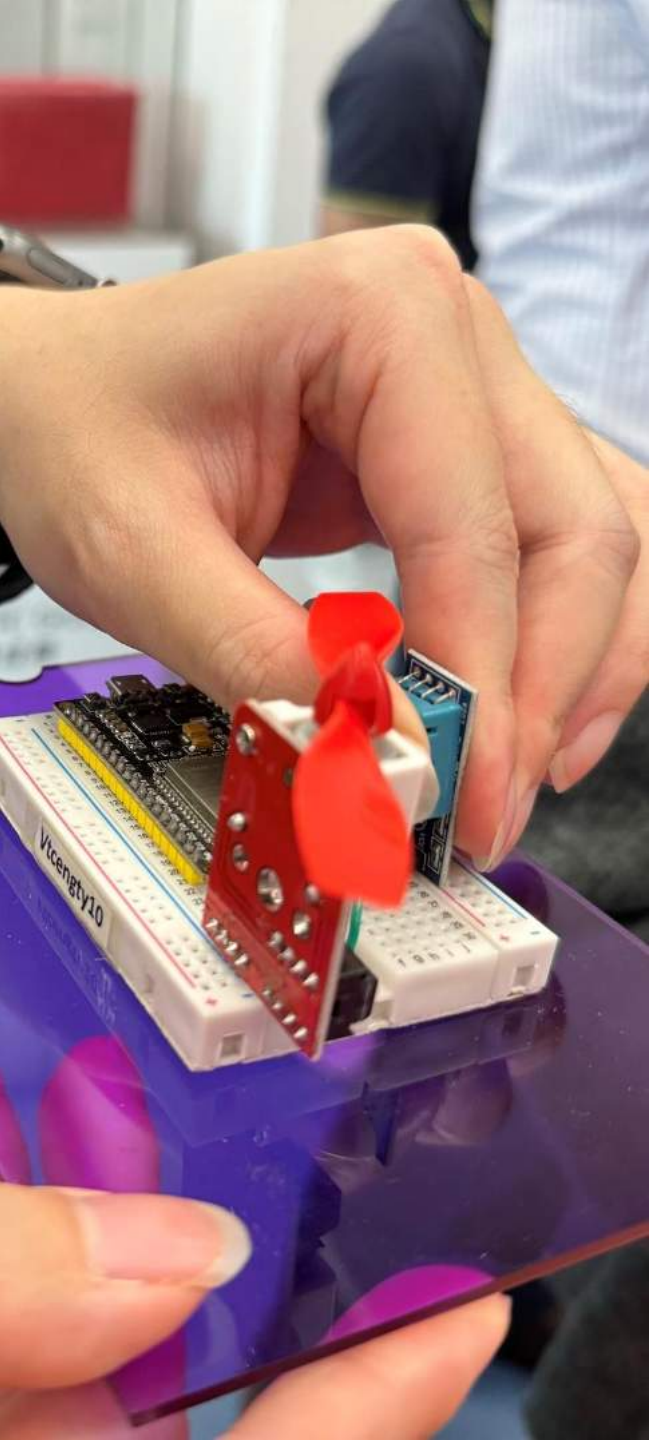
Policy Recommendation #2.3:
A modernisation of the evaluations of learning outcomes and teaching performance

Assessment of Teaching Performance

To modernise student assessment methods and weightings, changes in teachers' professional development are necessary to support this transformation:

Transforming lesson observation and book checking from a summative to a formative assessment. This will include restructuring of the lesson observation evaluation criteria and placing a heavier emphasis on the facilitation proficiency of teachers.

Connecting appraisal feedback to teacher professional development by assigning professional development opportunities based on the challenges identified through the appraisal process. This ensures teachers are adequately upskilled and receive focused support on disciplines where they require the most attention.



Focus Area 3:

Upgrade of the STEAM Education Infrastructure

GIFT

Focus Area 3: Upgrading the STEAM Education Infrastructure

Background & Challenges

STEAM education and **PBL** are closely related as both emphasise real-world problem solving, an interdisciplinary approach, and active, hands-on learning. When the two pedagogical methods are used effectively, they can develop critical 21st century skills, while allowing the development of a **student-centred learning** where students take ownership of their learning process. The dynamic and engaging learning environment is crucial in preparing students for future challenges and opportunities.

An **effective STEAM education system** requires **appropriate infrastructure**, including elements such as teacher training, curriculum support, judicious resource allocation, structured and systematic guidelines for implementation, and the long-term involvement of industries and civil society. These are all crucial for effective interdisciplinary learning and for students to apply theoretical knowledge to real life applications.

The current STEAM education system faces challenges, particularly among teachers, despite ongoing efforts to improve the system.

CURRENT SITUATION

Even though by the end of 2022, 95.7% of schools had implemented STEAM education either in classrooms or through extracurricular activities, there is a lack of **sufficient support and guidance on STEAM teaching methods and materials**:

- Only about **40% of teachers** have received systematic training specifically on STEAM education.
- Approximately **35% of schools** report insufficient support and guidance on STEAM teaching methods and materials.
- Only **29% of schools** have integrated STEAM classes into their regular curriculum.

Sources: Promotion of STEAM education in selected places, Hong Kong STEAM Education - International Trade Administration

CHALLENGES

- No **structured training and evaluation system for STEAM teaching**, despite the increasing demand for educators to reskill in response to the government's initiative to integrate STEAM into all K-12 schools.
- No **official guidelines or teaching materials** available for teachers. For dedicated teachers within the system, many are funding their own upskilling out of pocket.
- The nature of STEAM education necessitates that **teaching materials be updated every 2 years**, in contrast to the 6-year cycle for traditional curricula, making it increasingly challneng for teachers to stay current.
- Current industry engagement initiatives, such as the **Business-School Partnership Programme (BSPP)**, have limitations that hinder effective collaboration and resource sharing.

Policy Recommendations to Address the Challenges

Policy 3.1: Empower Schools with an On-Site STEAM Specialist

A STEAM Specialist position to be established in every K-12 school within 4 years. The role is exclusively responsible for overseeing the implementation of STEAM education, working closely with subject teachers and external stakeholders to enable interdisciplinary learning and PBL pedagogical approach.

Policy 3.2: Establish STEAM Training Centres

STEAM training centres are to be established within 3 years in all universities that offer PGDE programmes. The existing and future educators will go through compulsory and elective STEAM training to equip them with the skills to integrate STEAM into teaching.

Policy 3.4: Enhance STEAM Education Through a Statutory Body

Establish a statutory body to encourage long-term industry-school partnerships for PBL incorporated STEAM education. Building infrastructure to empower teachers and students to teach and learn the application of STEAM knowledge to real-world challenges, preparing future-ready students equipped with 21st century skills and competencies.

Policy 3.3: Facilitate Access to Resources via a Digital Platform

A transparent and one-stop digital platform supporting easy-access to STEAM resources and long-term stakeholder engagement for a PBL-incorporated STEAM education. Operated under the statutory body to ensure online and offline support.

Policy 3.5: Integrate GBA Resources into STEAM Education

Introduce a One-Year Cross Border Government Enterprise STEAM Scheme to engage GBA companies and schools in PBL project. This initiative will involve key technology companies in the GBA, fostering partnerships that benefit both students and companies by leveraging students' innovative ideas.

3.1 Empower Schools with an On-Site STEAM Specialist

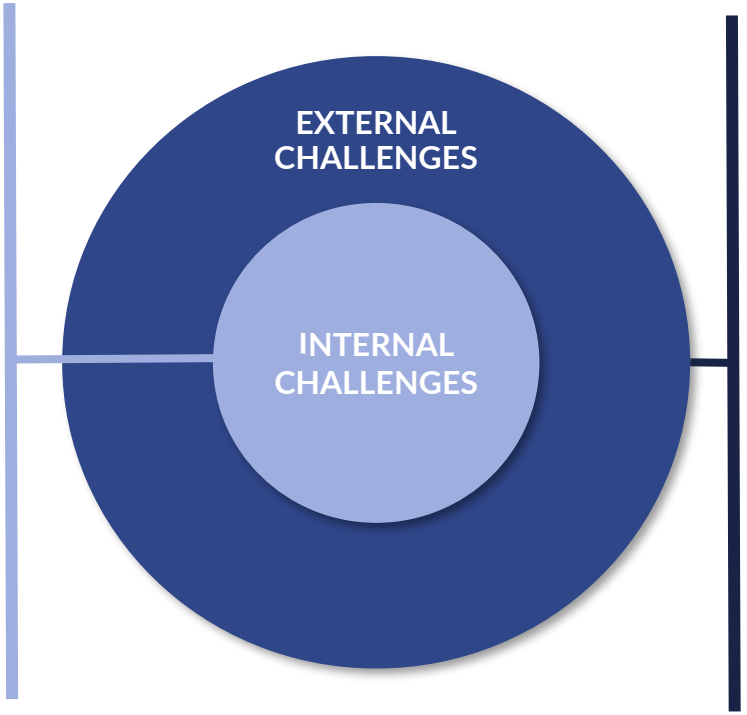
Policy Recommendation #3.1:
A STEAM Specialist position to be established in every K-12 school

Current challenges of STEAM Education at schools:

STEAM coordination tasks, such as curriculum development and materials preparation, are undertaken by teachers who are **already at full capacity**, resulting in additional workload and stress

Teachers often lack familiarity with STEAM coordination because their subject knowledge may be **disconnected from the latest technology trends**, leading to outdated curricula and teaching materials

The exam-oriented nature of the education system results in a **lack of focus on cultivating interest in STEAM**



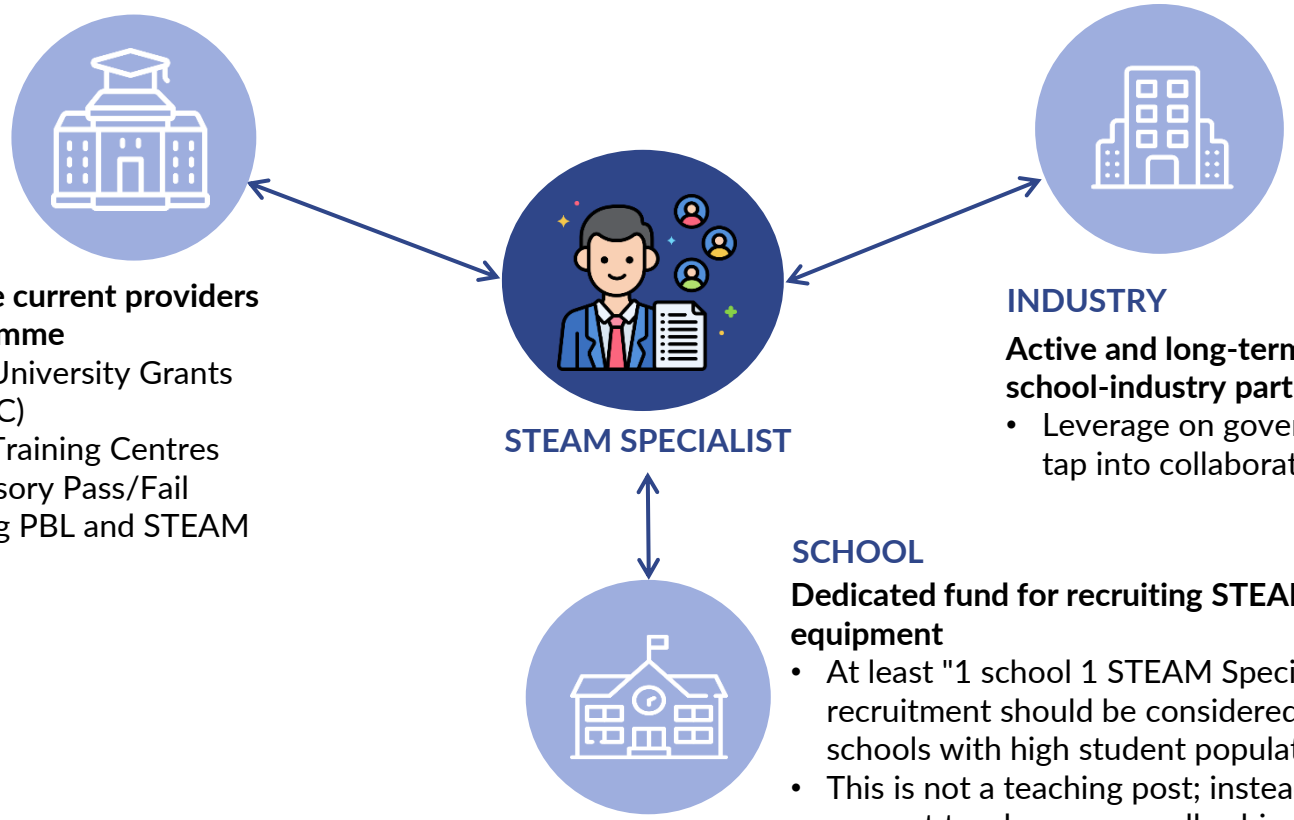
Schools often rely on outsourcing STEAM education to private vendors **without systematic and long-term strategic thinking**

Externally sourced STEAM workshops are conducted by trainers with diverse backgrounds, and there is a **lack of assurance regarding their STEAM qualifications or certification systems**

3.1 Empower Schools with an On-Site STEAM Specialist

Policy Recommendation #3.1:
A STEAM Specialist position to be established in every K-12 school

Collaboration between the STEAM Specialist, schools, universities, and industries:



UNIVERSITIES

Universities who are current providers of the PGDE Programme

- Funded by the University Grants Committee (UGC)
- Set up STEAM Training Centres
- Provide compulsory Pass/Fail courses teaching PBL and STEAM methodology

STEAM SPECIALIST

INDUSTRY

Active and long-term involvement in school-industry partnerships

- Leverage on government's support to tap into collaborations with industry

SCHOOL

Dedicated fund for recruiting STEAM specialist and equipment

- At least "1 school 1 STEAM Specialist." Additional recruitment should be considered for SEN schools and schools with high student populations
- This is not a teaching post; instead, this role will be to support teachers across all subjects in the preparation of STEAM teaching materials and equipment.

Focus Area 3: Upgrading the STEAM Education Infrastructure

3.1 Empower Schools with an On-Site STEAM Specialist

Policy Recommendation #3.1:
A STEAM Specialist position to be established in every K-12 school

Responsibilities and attributes of the STEAM Specialist:

RESPONSIBILITIES

- Coordinate with teachers of other subjects for effective **interdisciplinary curriculum planning.**
- Foster technological foresight within the school and oversee procurement and improvement of the school's **STEAM infrastructure.**
- Facilitate knowledge exchange with industry partners and tertiary institutions.
- Assess the effectiveness of STEAM lessons and curriculum.
- In addition to curriculum design, also responsible for extra-curriculum activities.

ATTRIBUTES

- Holder of **Bachelor of Education (STEAM),** a newly established specialisation taught by universities that currently offer the Postgraduate Diploma in Education (PDGE).
- A STEAM Specialist must fulfil a requirement of 30 hours of continuous training and assessments annually to remain up-to-date with technological and industrial knowledge and latest pedagogical methodologies.

BENEFITS FOR SCHOOLS

- Creates a **centre of excellence for STEAM education** implementation in schools across various subjects.
- Reduces teachers' workload to ensure **capacity for upskilling and ensure quality control** in the preparation of STEAM teaching materials and curriculum design.

FUNDING

- **Public and aided schools** will receive dedicated funding for the recruitment of STEAM specialists and equipment.
- The remuneration will be aligned with the **Master Pay Scale** at the same point as teachers (Pt. 15-33).
- The **estimated expense** will be
  1,104 (schools) x HKD 35,080 (Pt. 15) = **~HKD 38.7 million**

3.2 Establish STEAM Training Centres

Policy Recommendation #3.2:
Establish dedicated STEAM Training Centres within universities that offer the Postgraduate Diploma in Education (PGDE) to provide comprehensive training for teachers and STEAM specialists.

Current situation and challenges for teachers to effectively implement STEAM education within schools:

CURRENT SITUATION

- Approximately **30% of teachers** in Hong Kong have received STEAM education training for **1-5 hours**, **20% of teachers** have received **6-10 hours** of training.
- While the EDB has developed resources and support measures for STEAM education, **teaching materials are not standardised across all schools**, making it challenging for teachers with less capacity.
- Around **50% of teachers** in Hong Kong are now required to **self-fund their STEAM-related training**. In addition to the potential financial burden, they also struggle to find suitable training.

*Source: *Hong Kong Productivity Council (HKPC), STEM Alliance, Hong Kong Federation of Education Workers*

CHALLENGES

Professional development gaps:
Teachers lack the necessary knowledge in STEAM subjects or innovative teaching methods. The low percentage of teachers going through STEAM education indicates the need for more extensive and in-depth training for teachers.

Limited time and lack of a standardised curriculum:
Many teachers are hesitant to integrate STEAM into existing curricula due to their heavy workloads and a lack of clear directives. They also need to take unpaid leave or use personal time to attend training which can be financially burdensome.

Allocation of budget for teachers' training:
Despite EDB's financial support in upskilling teachers for STEAM education through Professional Development Programmes, Life-wide Learning Grant, and school STEAM implementation support, grants and funding may not always cover all the costs associated with comprehensive STEAM training.

3.2 Establish STEAM Training Centres

Policy Recommendation #3.2:
Establish dedicated STEAM Training Centres within universities that offer the Postgraduate Diploma in Education (PGDE) to provide comprehensive training for teachers and STEAM specialists.

The professional development roadmap for teachers and STEAM Specialists within *STEAM Training Centres*:

STEAM Training Centres

To be set up in the 5 universities that are current providers of the PGDE Programme, to offer STEAM education funded by the University Grants Committee (UGC)

香港浸會大學
HONG KONG BAPTIST UNIVERSITY

TEACHERS

- All teachers are required to complete the compulsory **Level 1 STEAM Teacher Accreditation** embedded in the PGDE program.
- Aspiring teachers can pursue **Levels 2 and 3 STEAM Teacher Accreditation** to enhance their competitive edge.
- Government scholarships are available for selected candidates.

STEAM SPECIALISTS

- STEAM Specialists are required to complete a **Bachelor of Education (STEAM).**
- They must fulfil a requirement of **30 hours of continuous training and assessments annually**.

3.2 Establish STEAM Training Centres

Policy Recommendation #3.2:
Establish dedicated STEAM Training Centres within universities that offer the Postgraduate Diploma in Education (PGDE) to provide comprehensive training for teachers and STEAM specialists.

LEVEL 1 (Compulsory)

- **The Level 1 (introductory) Accreditation** will focus on the **latest developments of STEAM teaching methodologies**.
- **For Teachers-to-Be,** the PGDE will include a curriculum of STEAM and PBL pedagogical training.
- **For In-Service Teachers**, they should undergo a complimentary short-term course within 5 years at one of the STEAM training centres.
- Teachers with prior STEAM training can be exempted through a standardised examination.

LEVEL 2 & 3 (Voluntary)

- **The Level 2 (intermediate) and Level 3 (professional) Accreditation** will focus on **in-depth integration of STEAM into teaching practices.**
- **A Continued Training scheme** accredits teachers with certification upon completing Levels 2 and 3 Voluntary STEAM training. Scholarships to be provided by the Government for exceptional talents.

STEAM SPECIALIST TRAINING PROGRAMME

Qualification
- A STEAM specialist must obtain a Bachelor of Education (STEAM) to receive in-depth training of STEAM knowledge and pedagogical methodology.

Continued Training
- Qualified STEAM specialists must accumulate 30 hours of continuous training and assessments each year to be up-to-date on STEAM and technological knowledge.

Focus Area 3: Upgrading the STEAM Education Infrastructure

3.2 Establish STEAM Training Centres

Policy Recommendation #3.2:
Establish dedicated STEAM Training Centres within universities that offer the Postgraduate Diploma in Education (PGDE) to provide comprehensive training for teachers and STEAM specialists.

STEAM Training Centres will be the portal for teachers and students through the following features:

Local and Overseas Education & Industry Experts
The source for trending tools, methodologies, and school-industry collaborating opportunities for STEAM education

Collaborative Learning Communities
A teachers-to-teachers* on top of schools-to-schools platform for shared experiences and mutual learning

**Teachers on site visits have expressed the benefit of teachers-to-teachers communication as the best method of mutual learning*

Teaching Support
Training, monitoring, and teaching materials support including lesson plans, PBL project ideas, and technology tools authorised by supporting universities

Benchmarking the funding of the new STEAM Training Centres

The Government had established a dedicated SEN specialist position to support 3,608 students with SEN. The allocated budget was HKD 67 million in the 2022-25 academic year. Benchmarking against these figures, **the expected funding amount for STEAM Training Centres will be approx. HKD 33.5 million** as the Centres are expected to be profitable.

3.3 Enhance STEAM Education Through a Statutory Body

Policy Recommendation #3.3:
Building infrastructure for long-term business-school partnerships

Limitations and Challenges of the Current Business-School Partnership Programme (BSPP):

Current school-industry partnerships operate on a **voluntary basis.** Students' exposure to real-life business settings vary, depending on each school's capacity and ability.

Industry support for schools' STEAM development is often dependent on **personal networks of school personnel**, particularly the schools' principals.

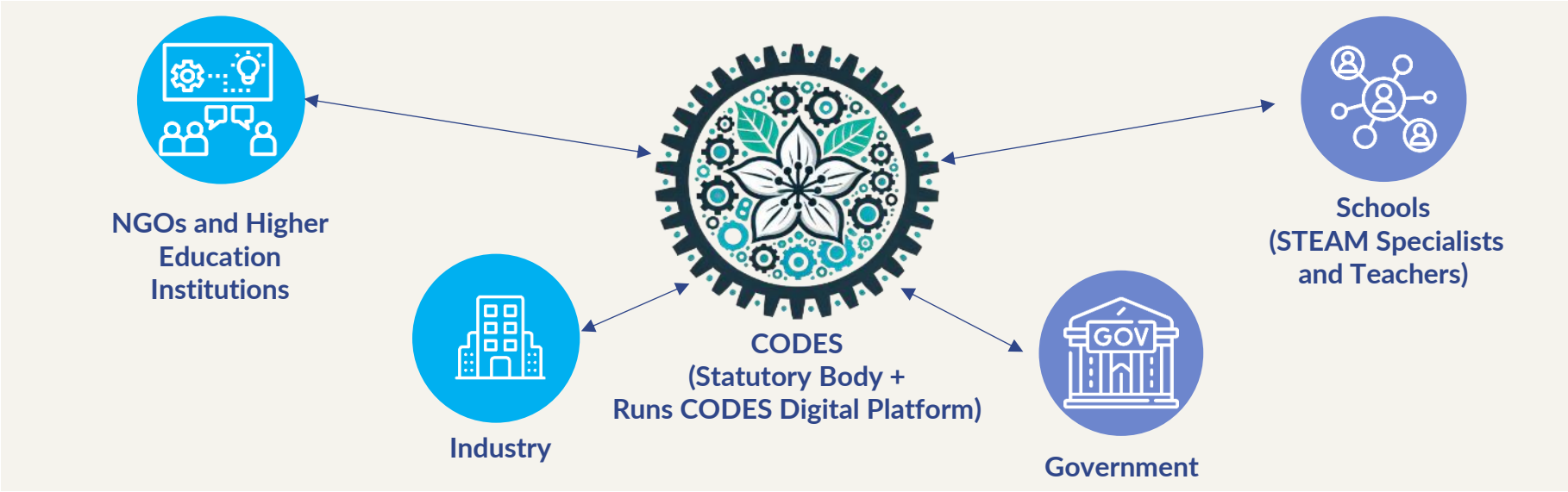
The existing BSPP is underutilised and tends to only foster one-sided and short-term school-industry collaborations.

RECOMMENDATIONS

- The BSPP should be mandatory and assessed along different stages of the students' learning ladder.
- A comprehensive one-stop digital platform as the centralised tool for facilitating school-industry partnerships will greatly support schools, STEAM facilitators, teachers, and companies in actively engaging in partnerships for PBL and STEAM education.

3.3 Enhance STEAM Education Through a Statutory Body

Policy Recommendation #3.3:
Building infrastructure for long-term business-school partnerships



- Inspired by the best practices of the award-winning *OER Commons (Open Educational Resources)*, the **CODES (Collaborative Opportunities for Development in Education and STEAM) institution** is established to oversee, implement, and facilitate initiatives related to STEAM education while fostering collaboration and resource sharing among stakeholders through a **digital platform**.
- CODES builds upon the **existing Business School Partnership Programme (BSPP)** to engage a broader range of stakeholders, including K-12 schools, higher education institutions, vocational and specialist schools, Ed-tech companies, and industry organisations that provide funding and STEAM resources.
- By offering a diverse array of readily available resources, the CODES aims to cultivate a culture of **collaboration and knowledge sharing**.

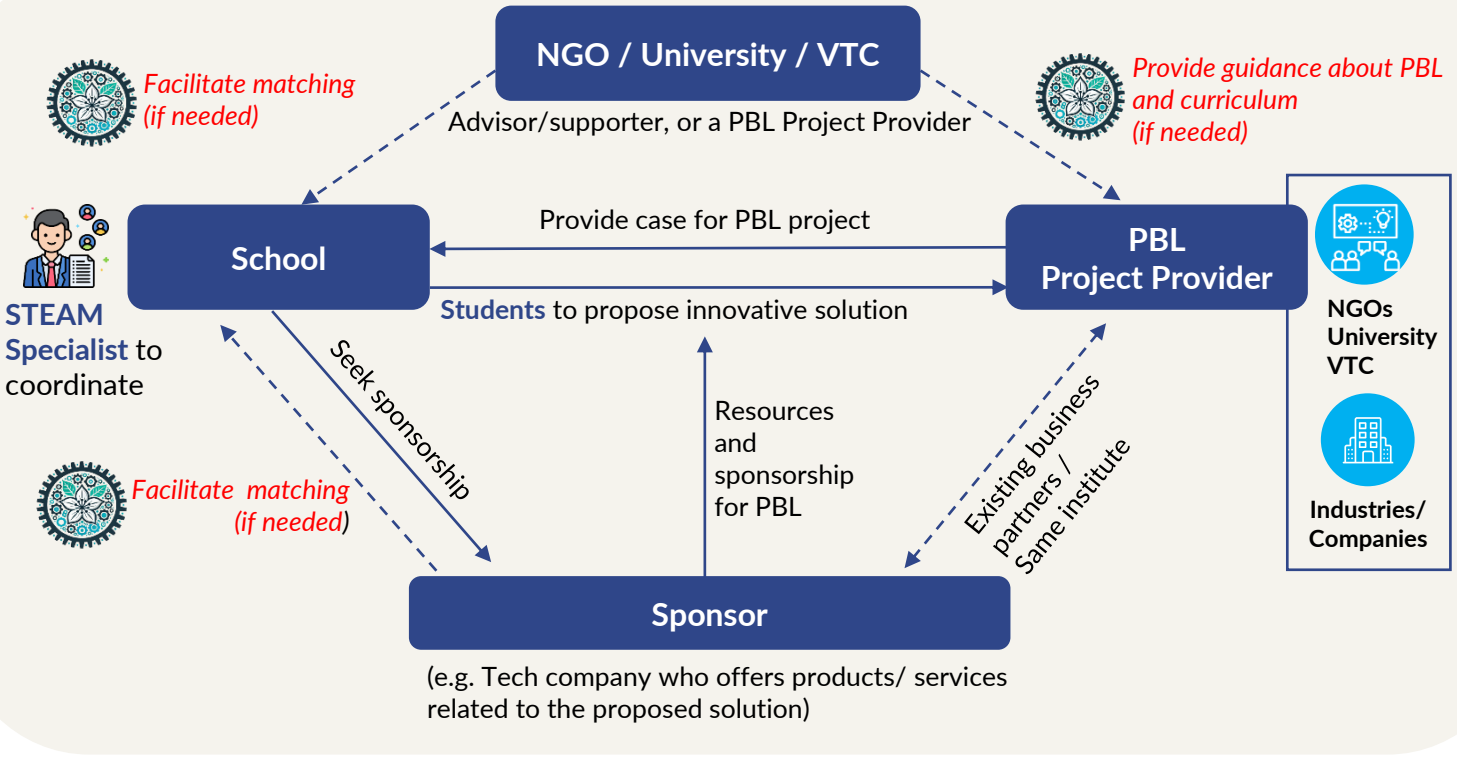
3.3 Enhance STEAM Education Through a Statutory Body

Policy Recommendation #3.3:
Building infrastructure for long-term business-school partnerships

CODES

- A **cross-sectoral** governing body
- **Quality control** of PBL
- **Funding support** for both schools and participating PBL Project Providers
- Owner of **Digital Platform** (p.61 for more details)

CODES Statutory Body Stakeholders and Mechanism



3.3 Enhance STEAM Education Through a Statutory Body

Policy Recommendation #3.3:
Building infrastructure for long-term business-school partnerships

MECHANISMS OF IMPLEMENTATION

教育局 Education Bureau

The EDB
- **Oversees the CODES** Platform and matching policy
- **Coordinates** funding and subsidies
- **Ensures quality** control of partnerships

STEP 1
PBL Project Supporter to register on CODES

- **PBL Project Provider** to register through CODES to express interest to collaborate. EDB to carry out screening
- **PBL Project Providers and Sponsoring companies** to co-create PBL curriculum with schools. This could ensure the PBL project allows real-life application of knowledge

STEP 2


STEAM Specialist to develop PBL project partnership

- Partnership can be developed through:
  - **Existing partnerships with PBL Project Providers**
  - **PBL Project Provider registered on CODES digital platform**
  - **Support from NGO/University/VTC /Sponsoring companies**
- Once PBL project partner is identified, STEAM Specialist to register the successful matching on CODES

STEP 3
STEAM Specialist to coordinate PBL project partnership

- Coordinate communication between internal (in-school) and external stakeholders (PBL Project Provider, Sponsoring company, etc.)
- Define project timeframes and ensure smooth execution of PBL
- Facilitate the integration of PBL projects into interdisciplinary learning
- Monitor and evaluate the overall learning experience of students

PBL Project Cycle

1. PBL **Project Provider representative** to provide case background to students
2. **Students** work in teams to engage and to identify a problem statement of the specific project
3. **Students** analyse and propose solution to the identified problem, applying their STEAM knowledge
4. **Sponsoring Company** to provide school with support and resources for the students' project work process
5. **Project Provider** to review students' proposal and offer practical comments, which will be incorporated in the school-based assessment

3.3 Enhance STEAM Education Through a Statutory Body

Policy Recommendation #3.3:
Building infrastructure for long-term business-school partnerships

Benefits of the newly proposed mandatory school-industry partnership:

Students

- Opportunity to engage in real-life problem-solving, which will foster future-ready mindsets and skills
- Understand the logic of applying technology to problem-solving
- Build business acumen and obtain feedback from industry professionals

Industries / Companies

By participating as a sponsor or project provider, companies benefit from:

- Access to fresh perspectives and innovative solutions at no or low cost
- Cultivate future talent and develop talent pipeline
- Product development and brand loyalty
- Community and multi-stakeholder engagement for ESG and CSR initiatives

Schools & Teachers

- Provides a healthy pipeline of real-world projects that even schools with limited capacity, resources, and connections can foster a good standard of education for their students
- Enhance schools' reputation and allow teachers capacity to focus on student-related work
- Foster stronger connections with the industry, potentially leading to internship or job opportunities for students

Universities / VTC / NGOs

- Engage in the process of K-12 education and participate in an early stage of cultivation for future talents
- Increase exposure for cross-sectoral collaboration
- Increase own brand awareness
- Access to fresh perspectives and solutions for social innovation

3.4 Facilitate Access to Resources via Digital Platform

Policy Recommendation #3.4:
Building a flagship digital platform under CODES for effective PBL and STEAM education

CODES (Collaborative Opportunities for Development in Education and STEAM)

STATUTORY BODY

- A cross-sectoral governing body responsible for the curation and matching of school-industry partnerships (including NGOs, University and VTC)
- Quality control of PBL
- Funding support for both schools and participating PBL Project Provider

Governing

Monitoring and evaluating data for future improvement

DIGITAL PLATFORM

A One-Stop Online Platform for PBL incorporated STEAM curriculum. Includes the following functionalities:

- Centralised repository
- Localisation of resources
- Facilitated Communication – Matching Functions
- Toolkit for PBL Projects

Active engagement and feedback

Curation and matching service

User evaluation, collaborations data, project portfolio

Resources for collaboration on PBL projects

STAKEHOLDERS

School

- STEAM Specialists
- Teachers
- Principals

PBL Project Provider, Sponsors and resource support

- NGOs
- University
- VTC

Industries/ Companies

3.4 Facilitate Access to Resources via Digital Platform

Policy Recommendation #3.4:
Building a flagship digital platform under CODES for effective PBL and STEAM education

The **transparency and accessibility** of STEAM pedagogical materials and resources can be greatly improved to help educators choose the right tools for best practices. A **transparent one-stop digital platform** may help companies such as the PBL project providers and Edtech vendors to provide the necessary information for schools, which will encourage long-term collaboration in the long run.

No Centralised Sharing Platform for Resources and Courses

A **comprehensive, centralised, and convenient sharing platform** for STEAM information and materials is necessary for stakeholders, particularly for teachers. There is an increasing number of STEAM service providing vendors, but the lack of verification and standardisation of resources makes it difficult for teachers to choose and incorporate STEAM tools and content into their teaching practices.

Limitations of Existing School-Industry Engagement

The **Business-School Partnership Programme (BSPP)** is facilitating connections between schools and industry, but the engagements are often surface-level and short-term, typically involving activities such as one-day company visits. A **systemic and long-term collaboration** can foster innovation through **cultivation of in-school talents**, and benefit business through aspects such as **product development**.

Lack of Ready-to-Use Resources and Language Barriers

The STEAM resources online are difficult to integrate into the lesson plans of local teachers due **to the lack of administrative and execution detail** and/or the resources are **not contextualised in the Chinese language and Hong Kong culture**, which hamper the local students' ability to learn and participate in the activities.

RECOMMENDATIONS

The ***CODES digital platform*** can be an elaboration of EDB's current online platforms such as the EdCity, E-Service Portal, and other public or private educational platforms in Hong Kong. Tools and content to be featured will undergo verification by experts sitting within the CODES Statutory Body to ensure quality and appropriate contextualisation against Hong Kong's local syllabus.

Focus Area 3: Upgrading the STEAM Education Infrastructure

3.4 Facilitate Access to Resources via Digital Platform

Policy Recommendation #3.4:
Building a flagship digital platform under CODES for effective PBL and STEAM education

KEY FEATURES OF CODES Digital Platform

(Collaborative Opportunities for Development in Education and STEAM)

Centralised repository
Centralised and dedicated platform allows all stakeholders to offer and share the latest STEAM education-related materials, equipment, technology and workshops

Localisation of resources
Government leads the localisation of existing STEAM resources. New contributors, particularly GBA vendors, are invited to offer their STEAM resources to be contextualised for the region

Facilitated Communication Toolkit for partnerships that provide a step-by-step guide on how to connect with stakeholders on CODES. **The platform should evolve to include matching functions.**

Toolkit for PBL Project matching functions and step-by-step guide for PBL project partners to co-create PBL with schools

EXPECTED OUTCOMES

Ease of access
Teachers save time and effort when designing and implementing STEAM lessons with ready-to-use resources

Equal access to high-quality education
All students can access the quality learning resources featured on the CODES digital platform

Monitoring and analysis
A one-stop solution that enables the collection and analyses of users' data and trends, which in turn can guide and improve pedagogical methods

3.4 Facilitate Access to Resources via Digital Platform

Policy Recommendation #3.4:
Building a flagship digital platform under CODES for effective PBL and STEAM education

IMPLEMENTATION TIMELINE FOR CODES Digital Platform

01 — Establishment of Statutory Body CODES

Milestone 1:
Launching CODES digital platform within 1 year of establishing the Statutory Body

Initial funding will be provided by the government for the development of the CODES digital platform.

02 — Building knowledge commons on the CODES Digital Platform

Milestone 2:
Schools to register on the CODES Digital Platform, free of charge for under a period of 6 months.

Stakeholders to contribute materials to the centralised and dedicated platform, verified by the statutory body

03 — Operation and evaluation of the CODES Digital Platform

Milestone 3:
2,000+ partners register on the platform and become a self-funded platform within 2 years

Schools and partners (industries and civil society) to provide feedback on a regular basis throughout the 2-year period, building up a sustainable operating system

Potential income beyond government funding to sustain the operations of CODES

- User subscription fees from industry partners
- Advertising revenue from STEAM education-related vendors
- Partnerships with technology companies

3.5 Integrate GBA Resources into STEAM Education

Policy Recommendation #3.5:
Leverage the abundant resources and geographical advantage of the GBA to initiate collaboration and partnerships via CODES

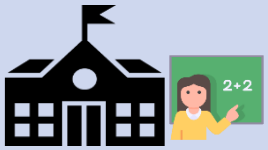
Integrating GBA into CODES is essential for preparing Hong Kong's future workforce, aligning with the blueprint to develop the region into a globally competitive hub. Students are encouraged to understand **Hong Kong's competitive advantages**, and **how to leverage the advantages through collaboration with companies, schools, and institutions in the GBA**. This integration promotes cultural exchange, broadens students' and teachers' perspectives, fosters innovation, and encourages resource sharing within the region. The benefits for different parties are illustrated below:

Government (Hong Kong/GBA Cities)

- Nurtures future workforce to expand and maximise competitive advantages
- Promotes cultural exchange between cities to build a more inclusive and harmonious society
- Develops a truly international innovation and technology hub (I&T hub) in the future through long-term talent development

Companies from Mainland China

- Opens companies' access to Hong Kong's talent pipeline which is known for its competitive advantages in upstream technological and scientific research, and downstream financing.
- Builds brand recognition
- Incorporates social responsibility
- Gain access to fresh perspectives and innovative solutions from K-12 schools and institutes in Hong Kong



Schools

- Gain access to a wider range of educational resources, particularly for PBL projects within STEAM education that are essential in cultivating students' 21st century skills
- Early exposure to the developments of the GBA, while increasing regional and cultural awareness
- Teachers may also benefit from professional development in collaboration with GBA institutions

3.5 Integrate GBA Resources into STEAM Education

Policy Recommendation #3.5:
Leverage the abundant resources and geographical advantage of the GBA to initiate collaboration and partnerships via CODES

A proposed *"1-year Cross-Border Government-Enterprise STEAM Scheme"* to be introduced in every academic year to engage in long-term collaboration between GBA companies and Hong Kong local schools, supported by the CODES infrastructure (See p.58).

3.5 Integrate GBA Resources into STEAM Education

Policy Recommendation #3.5:
Leverage the abundant resources and geographical advantage of the GBA to initiate collaboration and partnerships via CODES

TARGET TIMELINE & MECHANISM FOR IMPLEMENTATION

The **HKSAR government to lead the pilot scheme** for the *1-year Cross-border Government-Enterprise STEAM Scheme*. The pilot scheme is targeted to launch in the year when the first cohort of the STEAM Specialists graduate.

The pilot scheme will involve key companies within I&T industries from the GBA area, and it is encouraged that the pilot scheme should launch in both **selected primary schools and secondary schools in Hong Kong**, with the support from the GBA governments.

This scheme will also fulfil the existing ***National Education Policies*** where senior secondary school teaching staff and students are required to visit mainland China at least once, and primary and lower secondary school students are encouraged to organise tours but may lack the capacity and resources to do so.

- The scheme is **co-funded by the HKEDB and the corresponding education departments in GBA governments**. Technology firms to provide venues and experts to support the excursions. A visit day for **school-to-school exchange between Hong Kong and GBA schools** is also included as part of the scheme to encourage mutual learning between schools.
- **Incentive for companies**: A cross-departmental and cross-border collaboration is required to provide incentives for companies through policy tools such as a priority mechanism or whitelist status.
- **Incentive for schools:** Schools can receive priority for government funding, participation in other government initiatives, and represent Hong Kong as "*Best Engaged Schools*" at cross-border and international events.

3.5 Integrate GBA Resources into STEAM Education

Policy Recommendation #3.5:
Leverage the abundant resources and geographical advantage of the GBA to initiate collaboration and partnerships via CODES

STUDENT LEARNING LADDER AND TENTATIVE SYLLABUS

The *1-year Cross-Border Government-Enterprise STEAM Scheme* is intended for all students from Primary (P.1) to Secondary (S.6).

1st Semester	2nd Semester	End of Year
Problem Identification Under teacher supervision, students will complete preparation for the projects at school to develop a problem statement for the company.	**Site Visit & Presentation** Students will engage in site visits and modify their research according to their interviews and observations. The objective is to present their deliverables to school officials, government presentations, corporate sponsors, and parents.	**STEAM Ambassador Nomination** The best performing student in the scheme will be nominated as the STEAM Ambassador of their class and the school. The STEAM Ambassadors may foster: (1) Peer mentoring (2) Promotion of STEAM to the community as a school representative (3) Organisation of STEAM events with other schools

Assessment Method	Following the PBL Assessment method, students are assessed on the progress and results of their reports and presentations. Primary 6 (P.6) and Secondary 6 (S.6) students will be exempted and are assessed through worksheets.

3.5 Integrate GBA Resources into STEAM Education

Policy Recommendation #3.5:
Leverage the abundant resources and geographical advantage of the GBA to initiate collaboration and partnerships via CODES

ROLES & RESPONSIBILITIES OF STAKEHOLDERS

Principals

- At the **beginning of the academic year**, the principal is required to select an annual theme for the school
- The Principal is responsible for launching:
  (1) Assessments on teachers, STEAM Specialists, and students' learning outcomes
  (2) STEAM Ambassador Scheme
  (3) Outreach for collaboration opportunities with tech firms and schools through connections or by utilising the CODES platform
- At **the end of the school year**, the principal is required to submit an evaluation on the scheme to the Government and school management committee.

STEAM Specialists

- STEAM Specialists and teachers are **provided with training** during different stages of their professional development roadmap to learn about technological advancement and trends in the GBA
- STEAM specialists work closely with the CODES statutory body and principals to **develop class demonstrations, exchange sessions, and sister-school networks**
- In the **1-year pilot scheme**, the STEAM Specialist and school teachers will be able to practice developing PBL projects, hosting cross-border inter-school activities, and assess and evaluate the CODES platform mechanism for regular feedback and refinement.

GBA Companies

GBA companies may contribute through the following initiatives:

- Provide **site visits and workshop content** to CODES platform. Companies are encouraged to engage in formulating PBL projects
- Develop **mentorship programme and career prospects** for students in secondary school level
- Engage in **training programmes for STEAM Specialists** via collaborating with STEAM Training Centres in online training, school visits, and company visits

GBA companies benefit from promoting brand loyalty, and gain insights on user behaviours and innovative ideas for product development.

Recommendations on Other Funding Sources and Allocations

GIFT

Funding Sources for Education

Beyond the recommended sources of funding and allocation specific to the policies recommended in the previous sections, this section outlines other available sources that can be considered to support teacher upskilling, STEAM teaching, and incorporation into CODES to enhance capacity building for schools.

Government Funding for K-12 Public Education

- To support public schools in providing quality education, **EDB provides grants** to schools to enhance their operational capacity. These grants provide schools with the resources to hire additional staff and/or purchase external services.

  The **annual grant of HKD 900 million to primary and secondary schools aims to enhance STEAM teaching** materials and facilities:

  - **STEAM Resources**: The EDB has launched a STEAM resources website, offering a variety of teaching materials, workbooks, and games for teachers and students
  - **Teacher Training**: Continuous professional development courses related to STEAM are offered to help teachers stay updated with the latest innovations in technology.
  - **School Infrastructure**: Grants are provided to schools to upgrade facilities and equipment, including "one-off grants" for publicly funded primary schools to enhance their STEAM-related resources
- Besides the EDB, schools can apply for grants **from IT Innovation Lab in Schools**, a scheme under the Digital Policy Office.
- To facilitate innovation in the education sector, the government set up **Quality Education Fund** in 1997 to facilitate non-profit making education innovation initiatives.

Non-government monetary support for education

There are several charitable trusts that provide funding for educational initiatives and resources for schools in Hong Kong. For example:

Hong Kong Jockey Club Charitable Trust (HKJC): A significant supporter of education in Hong Kong. HKJC supports education through scholarships, school improvement projects, educational resources for underprivileged students, and advocates collaborations with universities, schools, and other NGOs.

Swire Trust: Supporting projects serving marginalised communities with the potential to scale up. As of 2023, the committed amount of ongoing education projects was HKD 62 million.

Bright Future Charitable Foundation: Since 2016, the foundation has funded the establishment of the “Peng Cheng Young Engineers College” at the Hong Kong University of Science and Technology (HKUST), providing engineering workshops for university students and secondary school students. It also launched the Innovation Technology and Engineering Leaders Forum with HKUST to promote STEAM education.

D.H.Chen Foundation: The foundation has been a core partner of Teach for Hong Kong since 2016 that enlists outstanding university graduates to serve underprivileged schools to nurture future leaders. It also provides scholarships and support capacity building for NGOs including those that support the education system.

Funding Allocations Proposal

In addition to the funding allocations outlined in previous sections, below are two additional proposals for funding consideration. They aim to increase financial support for public schools while fostering collaboration among stakeholders to enhance educational resources.

Proposal 1: A Centralised Grants Matching System

A **matching platform** that provides transparency and a unified one-stop-solution for schools is particularly useful for schools with less capacity and connections, as well as for the community to understand the needs of specific schools.

A potential benchmark or replicable model for reference is the **University Grants Committee (UGC)**, which matches donations and research grants from charitable and philanthropic organisations to suitable universities and higher education institutions. This can serve as a model for K-12 schools to gain community support for PBL project implementation, facilities upgrades, teachers training, corresponding to the infrastructure development of CODES.

Case reference

Research matching grant scheme, the UGC, Hong Kong

IT School Lab in Schools (Secondary)

"Knowing More About IT" (Primary)

Proposal 2: Tax Reduction

Businesses in Hong Kong currently receive tax deductions for donations made to any charity, exempted from tax under Section 88 of the Inland Revenue Ordinance, as well as for contributions to the government charitable purposes. It is recommended that this **coverage be extended to public schools** to incentivise greater funding support from businesses.

A potential benchmark for estimating funding requirements is the teacher exchange programme offered by the **Royal Academy of Engineering (RAEng)** in the UK. Although the RAEng operates as a national academy rather than a business, its model can help in assessing necessary costs and identifying key stakeholders. The programme allows teachers from its network of schools to spend 10 days working in engineering firms. To support this initiative, the Academy provides allowances for schools to hire substitute teachers during the period of absence.

Case reference

Royal Academy of Engineering, the UK - Lord Bhattacharyya Engineering Education Programme Industrial Secondments

Supply Teacher Daily Rate

Conclusion

GIFT

Conclusion:
Preparing Tomorrow's Leaders

As the adage goes, *"It takes a village to raise a child."*

Young people are the foundation of society. This proposal's policy recommendations aim to guide the Hong Kong public K-12 education system in equipping the next generation of students with the skills necessary to thrive in an increasingly complex future. Achieving this goal will require reforms in **teacher professional development**, **assessment mechanisms**, and the **STEAM infrastructure**, supported by unwavering dedication from all members of society. At the very least, the hope is to spark meaningful discussions and changes in the Hong Kong public education system.

To continue nurturing future-ready graduates, Hong Kong must seek support and collaboration beyond the school environment. **Parents**, **educational institutions**, and both **public** and **private organisations** must all play impactful roles. This includes rethinking parenting paradigms and fostering community partnerships that provide support and resources for high-quality education in the technological era.

GIFT GLOBAL INSTITUTE FOR TOMORROW.

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