

QAD – Dissemination Seminar on Effective School Practices

**Refining Whole-school Curriculum
through the P-I-E Cycle:
Promoting Innovation &
Technology Education**

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Suggestions from ESR 2017

1. Planning:

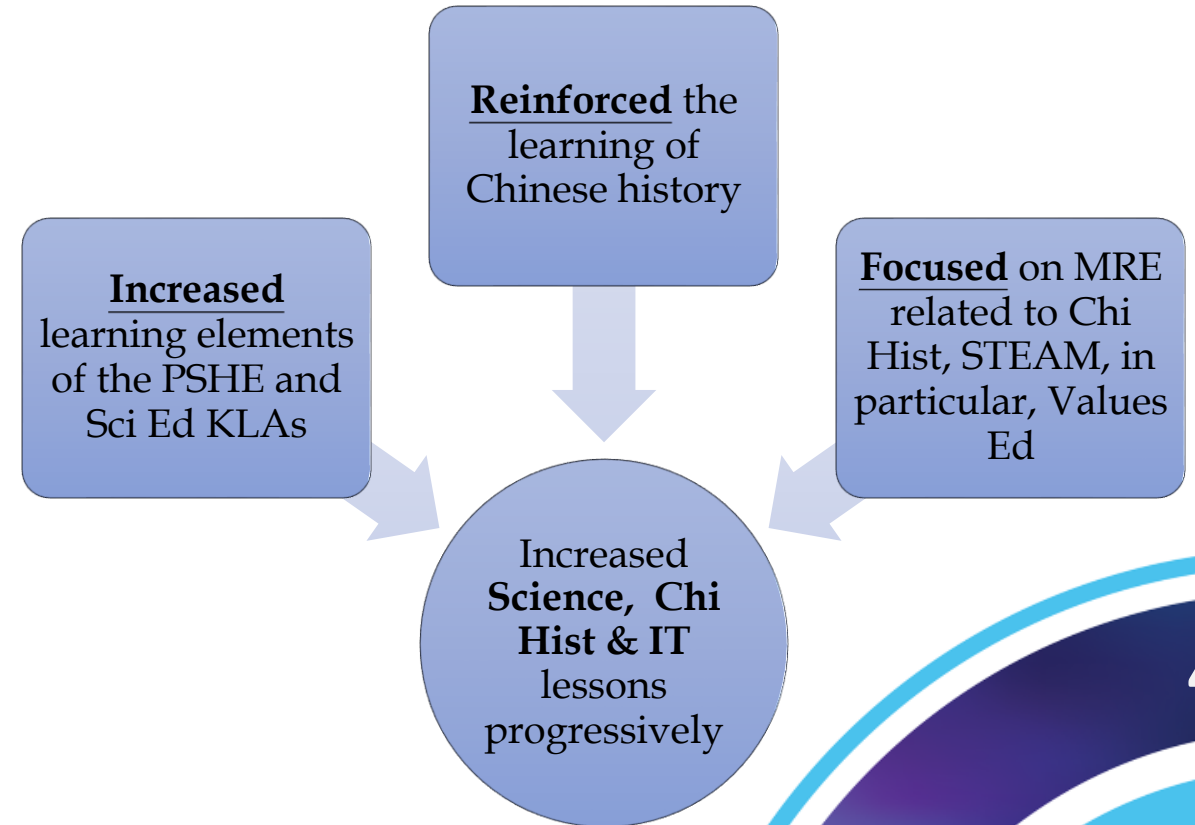
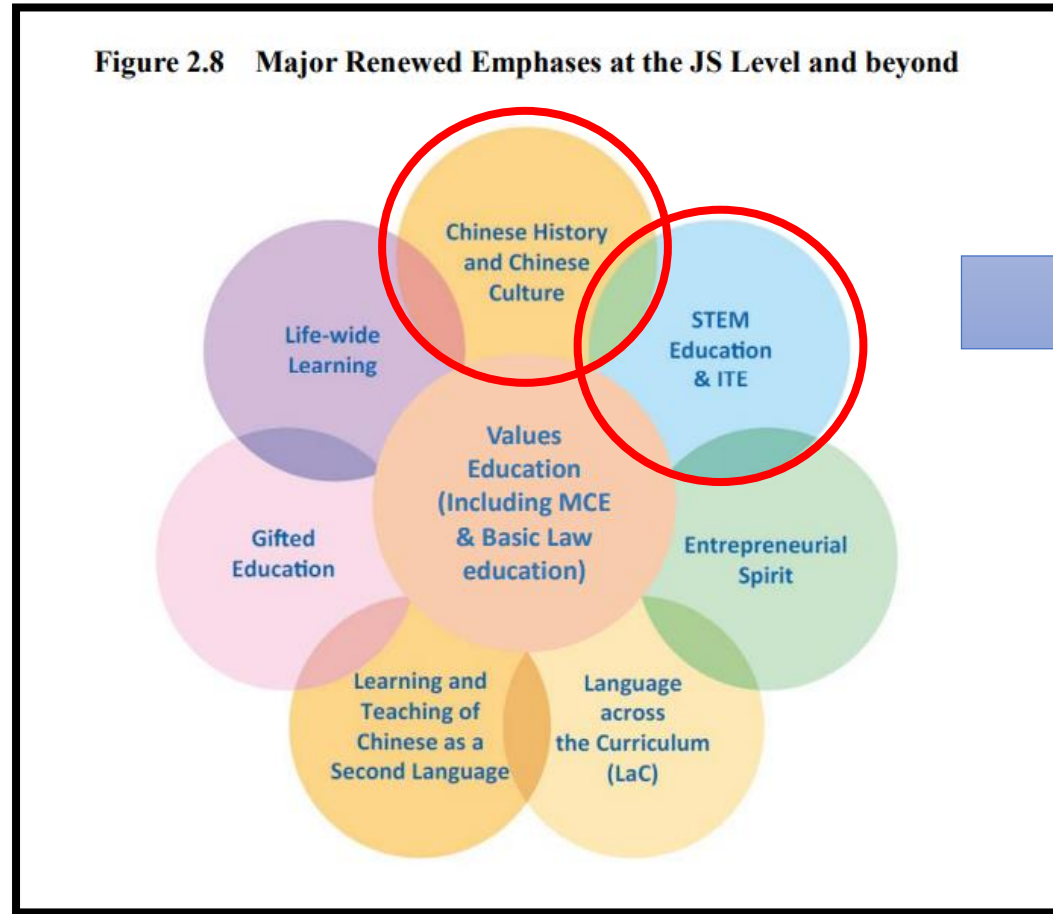
- more appropriate success criteria
- reflect more precisely the expected impact on student learning and development
- In relation to the planned targets at both school and department / team levels

2. Evaluation:

- emphasizes on the sharing of success factors and exploring specific catalysts for further improvement
- formulation or revision of the targets and strategies for the next stage of development (**Reflection, Follow-up Action**)

Continuous Development of Whole-school Curriculum through the P-I-E Cycle

Changes in Junior Secondary Curriculum



Reference: Secondary Education Curriculum Guide (2017), Booklet 2, P.14

Changes in Junior Secondary Curriculum

Increase in the number of lessons progressively in

- Junior Forms Science
- IT
- Chinese History

Effectiveness: Teachers' Perception of Curriculum & Assessment
Key Performance Measures (KPM)

- ✓ Curriculum changes are based on the suggestions from ESR, Major Renewed Emphases (MRE) and school self-evaluation data

Changes in Senior Secondary Curriculum

- **Co-curricular Enrichment (CCE)** is arranged in lesson time
- CCE involves Technology & Living, Visual Arts, Music & Stage, Career-related experience, Self-directed learning, **math modelling** & calculus
- New content, such as math modelling, was introduced when SS curriculum was optimised

**Promoting Innovation & Technology
Education and Development of
STEAM Education Curriculum
– An Example**

Background

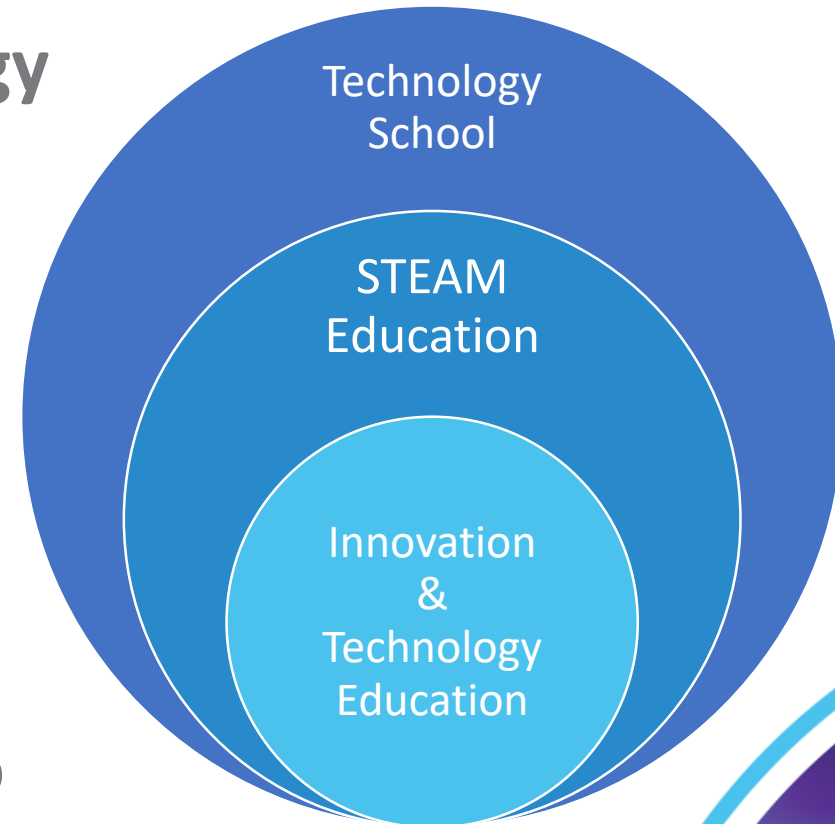
01 Individual but Integrated
Involving different departments

**02 Solid Math and Science
Foundation**

**03 Support from other
subject domains**

Technology School

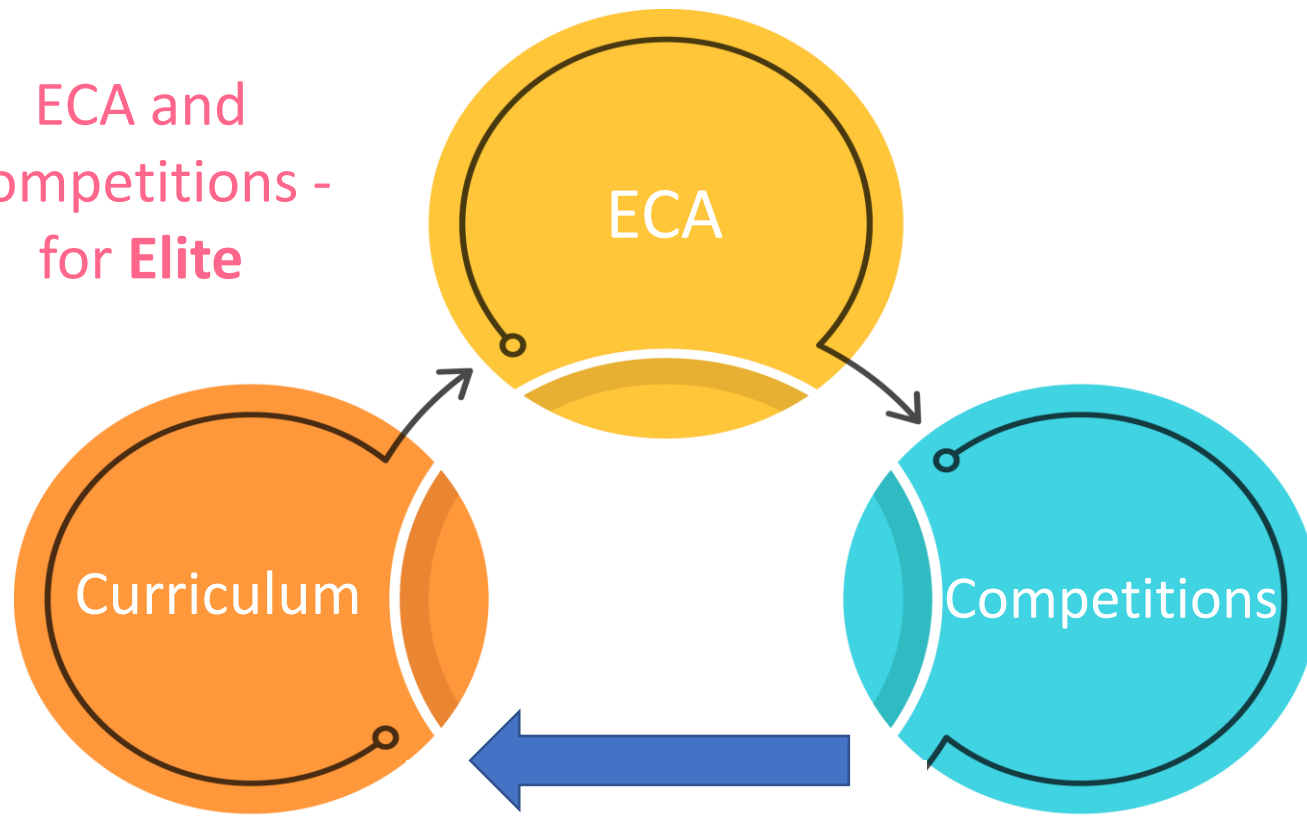
- An updated innovation & technology (I&T) education curriculum for all students with 90% students enjoy studying it and find it useful
- Vibrant and extensive ECA opportunities to nurture elite students
- The school has **15%** of students who participate actively in I&T related ECAs



STEAM Education - Individual but Integrated

	Science	Math	IT
Curriculum Highlights	<ul style="list-style-type: none"> • Robotics • Reverse Engineering - Loudspeakers 	<ul style="list-style-type: none"> • Math Modelling 	<ul style="list-style-type: none"> • Artificial Intelligence • Robotics • Coding • Video Production
ECAs	<ul style="list-style-type: none"> • Electronic and Robotics Team • Laser cutting workshop 	<ul style="list-style-type: none"> • Math Team • Math Club • Math Theme week 	<ul style="list-style-type: none"> • Programming Team • Technology and Innovation Team
Competitions	<ul style="list-style-type: none"> • The 9th Annual International Mathematical Modelling Challenge • Mathematics Project Competition • Digi-Science Video Production Competition • FIRST Tech Challenge Hong Kong Tournament (Robotics) • AI competitions / Apps development competition 		

ECA and
Competitions -
for **Elite**



Curriculum -
for **All**

Curriculum Development *Principle #1*

- ECA as a tool for experimentation in teaching
- Evaluation on experience gained and students' performance
- Incorporating related learning elements in the curriculum

Curriculum Development

Principle #2

Targets for Implementing STEAM Education

01 **Gap** between skills demanded by employers and knowledge generated in schools

02 **Complements** the development of 21st century skills

03 **Ability** to develop solutions to problems in everyday life with **an innovation mindset**

Latest Initiative: Develop as a Technology School

How to equip students' ability for innovation through STEAM education?

STEAM for Innovation for All

01 Proficiency in digital literacy and computational thinking

02 Support from other subject domains

03 Project work for innovation

2022

TIMELINE

2021

2018-19

- 2 IT lessons per week
- Introducing new teaching module (e.g. VR, AI, etc.)
- AI for the Future project (tertiary institute)

- Implementation of **Digital Literacy** and **Computational Thinking** in S2
- Conducting students' survey for the change of examination mode
- Subject Collaboration

- Officially renaming the subject to IT (Digital Literacy) and IT (Computational Thinking)
- Introducing the **project work** as the major **assessment method**

**STEAM for
Innovation**

Updating IT Curriculum for Promoting Innovation

Digital Literacy

- Focus on developing students' **technological proficiency**
 - finding a right tool
 - information presentation
 - handling digital content
 - ethics in digital age

Computational Thinking

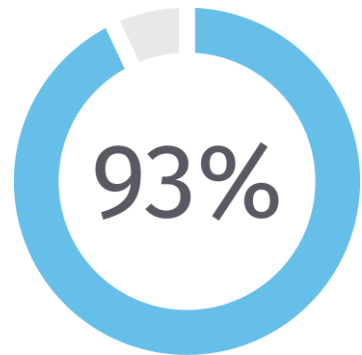
- Focus on developing students' logical thinking and **innovative mindset**

Updating IT Curriculum for Promoting Innovation

Curriculum planning based on evaluation data and information, e.g.

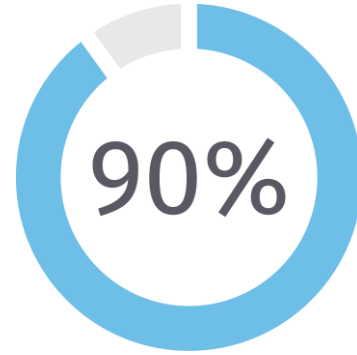
- students' feedback
- teachers' observations

Digital Literacy

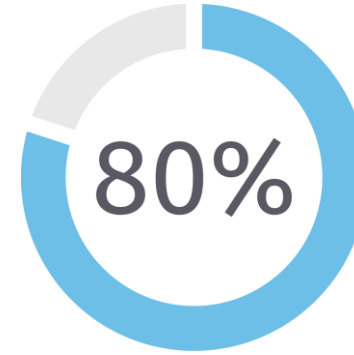


Enjoy the new change in S2

Computational Thinking



Agree to cancel the written exam



Positive to new assessment method

New Assessment Method: Project Works of Digital Literacy

S1	S2	S3
<ul style="list-style-type: none">• Apply generative AI in decorating the school libraries and other facilities• A presentation project on artificial intelligence [applications of AI in daily lives]	<ul style="list-style-type: none">• Design multimedia products (e.g. poster, sticker, video, etc.) that incorporate knowledge from other subjects [characters from Chinese history, History of Europe, music collaboration, etc.]	<ul style="list-style-type: none">• Apply generative AI in presenting ideas, e.g. Theme: Hong Kong [Chinese language]• AI in architecture (redesign a building for the school)

New Assessment Method: Project Works of Computational Thinking

S1	S2	S3
<ul style="list-style-type: none">• Design a mobile app that promotes healthy living style [science]• Design a mobile app that uses AI technology [sustainable goal, social innovation]• Develop a hardware solution for tracking moving objects [science, electronics]	<ul style="list-style-type: none">• Develop AI voice-controlled solutions to control various hardware devices, such as drone, robots, etc. [language model]• Design a virtual musical instrument [music]• **Design a pattern using coding [math and visual arts]	<ul style="list-style-type: none">• Develop an app that provides a 3D experience for users in which all the non-playable characters (NPC) are powered by generative AI technology [story-telling, physics]• Develop an app using AR technology

Example

Rubrics of a Project – ****Designing a Pattern using Coding**

Basic Pattern Creation (50%)	Usage of For Loop (20%)	Aesthetics
<ul style="list-style-type: none">(30%) Functionality: The pattern should be generated using a for loop and should demonstrate a clear understanding of how to use loops in Python.(20%) Complexity: The pattern should showcase the ability to manipulate loop variables effectively, demonstrating an understanding of loop control flow and iteration.	<ul style="list-style-type: none">(10%) Loop Structure: Proper usage of a for loop is demonstrated, including correct initialization, condition, and increment/decrement of loop variables.(10%) Nested Loop: Implementing a nested loop to create a more intricate. The nested loop should be relevant to the overall design and enhance the complexity of the pattern.	<ul style="list-style-type: none">(10%) Color Scheme: The pattern should exhibit a well-chosen and visually appealing color scheme.(10%) Design of Pattern: The pattern should showcase creativity and originality in its design.(10%) Attention to Detail: The pattern should display attention to detail, including precise positioning of elements, consistent spacing, and clean lines.

For “All” and for “Elite”

2022

2021

2019

- Implementation of the Innovation for a Better World competition

- **Technology School Initiative**
- Implementation of the AI Lab and Innovation Lab
- Collaboration with professionals in the IT industry

- Coordination of all technology-related ECAs
- Introducing the Certified Exams
- Promoting peer-sharing and **self-directed learning**

A **Artificial Intelligence**
Future jobs

B **Big Data**
Data analytics; Use of data

C **Computational Thinking**
Problem solving; system development

D **Digital Literacy**
Digital skills, presentation of ideas

Domain of OLE and Curriculum

STEAM Education

E **Entrepreneurship**
*Metaverse; business model; YouTuber
Creative Arts*

F **Fintech**
Blockchain

Students' innovation projects that apply subject knowledge from different domains

**Integrating multi-disciplinary
knowledge with digital literacy and
computational thinking**

01

Health Tech

Asthemeter

Students' Innovation

02

Artificial Intelligence

Art-In Anxiety-Out – A Virtual Art Therapist

03

Social Innovation

Nurture problem solving skills, positive values
and foster entrepreneurial spirit, etc.

Thank you!