

Enriched IT Programme in Secondary Schools

Interim Review Report

1. Introduction

1.1 Background

- 1.1.1 Information Technology (“IT”) has been developing rapidly and impacting on our economy. In response to the increasing demand for IT talent, we need to identify and cultivate young IT talent early to meet the manpower needs of a digital society.
- 1.1.2 Schools are among the suitable places to nurture IT talent. Early exposure to IT during students’ formative years, especially in logical thinking and creative problem-solving, is conducive to their development in becoming innovative and capable IT professionals and tech entrepreneurs. Even through participation in project-based learning and competitions outside the classroom, students can learn about the potential and versatility of computing in everyday life.
- 1.1.3 To identify gifted young people earlier, the Financial Secretary announced in the 2014-15 Budget incorporation of enrichment programmes in secondary schools which are outstanding in IT education to cultivate young IT professionals and even entrepreneurs to meet the development needs of a digital society.
- 1.1.4 Against this background, the Office of the Government Chief Information Officer (“OGCIO”) launched the pilot project of Enriched IT Programme in Secondary Schools (“EITP”) from 2015/16 to 2022/23 with a funding of \$75 million. The eight-year programme comprises two parts -
- (a) Enriched IT Class Programme (“EITC”) – eight partner secondary schools are funded to organise Enriched IT Classes (from Secondary S2 to S6) and provide intensive IT training to students who are interested and talented in IT; and

- (b) Enriched IT Activities Programme (“EITA”) – other publicly funded secondary schools are funded to organise enriched IT activities outside regular classroom learning to foster an IT learning atmosphere and stimulate interest in IT in the school community.

1.2 The Interim Review

1.2.1 As EITP moved into its fourth year of operation, OGCI0 conducted an interim review in 2018 with the following objectives –

- (a) to assess if the implementation outcomes are in line with the objectives of EITP;
- (b) to assess the effectiveness of the implementation of EITP;
- (c) to assess the on-going need for the EITP;
- (d) to assess the sustainability of the EITC model; and
- (e) to formulate recommendations on the way forward given the time-limited and pilot nature of EITP.

1.2.2 To gauge the views and expectations of stakeholders on EITP, OGCI0 commissioned Aristo Market Research and Consulting Co., Ltd (“survey company”) to conduct a survey.

1.3 Survey Methodology

1.3.1 The survey company conducted the following qualitative and quantitative research activities and assess the extent to which the objectives of cultivating IT talent and promoting IT learning are achieved through the implementation of EITP –

- (a) in-depth interviews with principals of EITC partner schools;
- (b) focus group discussions with members of the then Steering Committee of EITP, School Councils of secondary schools, heads of Computer

Science or related departments of tertiary institutes and EITC partner schools teachers;

- (c) questionnaires for EITC partner school principals, teachers, students and parents and EITA school teachers, students and parents; and
- (d) analysis of data from reports, spreadsheets and documents submitted by EITC partner schools and EITA participating schools (“School Reports”).

1.3.2 Details of the survey coverage are set out at **Annex 1**.

2. Major Survey Findings

2.1 Overall Findings

2.1.1 The following are the major survey findings on the overall implementation of the EITP –

- (a) the industry, academia and the school community appreciated and welcomed the implementation of EITP;
- (b) organising different kinds of IT activities outside classroom learning is conducive to arousing students’ interest in IT and cultivating their innovative mind-set and logical thinking;
- (c) participating schools consider that funding support should be increased to further strengthen the promotion of IT learning such that all secondary schools will benefit;
- (d) students’ understanding of the importance of innovation and technology helps them embrace the adoption of technology;
- (e) EITP has helped stimulate students’ interest in IT, and nurture students’ abilities in computational thinking and logical thinking; and
- (f) participating schools consider that more flexibility and autonomy should be provided to schools to organise IT activities that best meet the schools and students’ needs and abilities.

2.2 Implementation of EITC

2.2.1 The eight partner schools of EITC are listed below (in alphabetical order) :

- (a) Cheung Sha Wan Catholic Secondary School
- (b) Christian Alliance SW Chan Memorial College;
- (c) Pak Kau College;
- (d) Pui Ching Middle School;
- (e) Shun Tak Fraternal, Association Yung Yau College;
- (f) St. Paul's Convent School;
- (g) The Y.W.C.A. Hioe Tjo Yoeng College; and
- (h) Tin Ka Ping Secondary School.

2.2.2 In the 2018/19 school year, there are 34 IT Classes (from Secondary S2 to S6) operated by the eight partner schools, and 1 177 students attending the classes.

School year	2015/16	2016/17	2017/18	2018/19
Number of IT Classes	10	20	28	34
Number of students in IT Class by the end of school year	343	671	857	1 177 [#]

[#] as at January 2019.

2.2.3 The partner schools have provided intensive IT training to students who are interested and talented in IT in the form of IT Classes from S2 to S6 since the 2015/16 school year, with an average of 2-3 hours per week. Interested students are free to enrol in the IT Classes. All partner schools launched their first IT Classes in S2, while two of them, namely Pui Ching Middle School and Shun Tak Fraternal Association Yung Yau College, offered additional S4 IT Classes in the 2015/16 school year.

2.2.4 The curriculum framework for EITC was formulated to guide the partner schools in providing a learning environment conducive to unleashing IT Class students' talent and potential. In the curriculum framework of the junior IT Class, there are six core modules and two elective modules. For

the senior IT Class, there are three core modules, two project modules and one session of work appreciation activity. The curriculum framework of EITC is as follows –

	1st Term	2nd Term
S2	S2(1) - Creative Thinking	S2(3) - Digital Games
	S2(2) - Mobile Apps	Elective Module (designed by partner schools)
S3	S3(1) - Problem Solving & Programming	S3(3) - 3D Modelling & Augmented Reality
	S3(2) - Robotics & Sensors	Elective Module (designed by partner schools)
S4	S4(1) - Software Development & Technology Appreciation 1	
	S4 Project (designed by partner schools)	
S5	S5(1) - Software Development & Technology Appreciation 2	
	S5 Project (designed by partner schools)	
S6	S6(1) - Communication & Collaboration	Work Appreciation Activity

2.2.5 From the 2015/16 to 2017/18 school year, the percentage of IT Class students proceeded to attend the next level of IT Class ranged from 88.6% to 94.2%.

	2015/16	2016/17	2017/18
Percentage of students proceeded to attend the next level of IT Class	88.6%	90.9%	94.2%

Major reasons for individual students' decision to drop out included time clash with other extra-curricular activities; heavy workload and study pressure of senior students; need to allocate more study time to keep up their academic performance; and anxiety about not being able to attain the expected IT skill level.

2.2.6 Each partner school receives a sum of \$250,000 per IT Class per year, and a maximum provision of \$1 million for acquiring IT facilities within the eight-year programme period. To support the running of EITC in the partner schools, \$57M (about 76%) out of the \$75M programme funding has been allocated (details at [Annex 2](#)). On average, around \$7.1M was allocated to each partner school. Up to March 2019, \$30.3M has been granted to the partner schools in the four school years from 2015/16 to

2018/19 to administer IT Classes and to acquire and operate IT facilities to support its operation. The details are as follows –

School Year	2015/16 (\$)	2016/17 (\$)	2017/18 (\$)	2018/19 (\$)	Total (\$)
Class Grant to partner schools	2,500,000	5,000,000	7,000,000	8,500,000	23,000,000
Facilities Grant to partner schools	4,131,766	2,625,286	124,170	382,829	7,264,051
Total :	6,631,766	7,625,286	7,124,170	8,882,829	30,264,051

2.2.7 Principals and teachers-in-charge of the EITC partner schools all concurred that EITC had a positive impact on creating an IT learning atmosphere in schools, nurtured students’ knowledge and ability of IT and enhanced students and parents’ perception and understanding of the IT industry and career. These have been supported by the quantitative findings of the survey as set out below –

(a) IT Class students’ active participation in IT Class activities

Chart 1. Students had actively discussed the teaching content with teachers and classmates during the IT Class

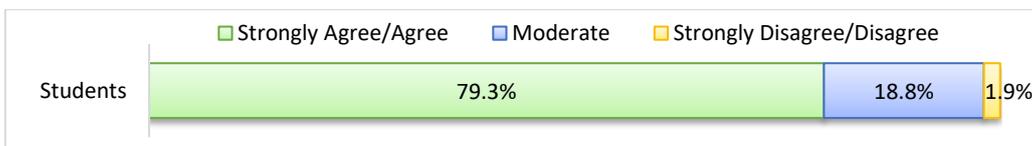
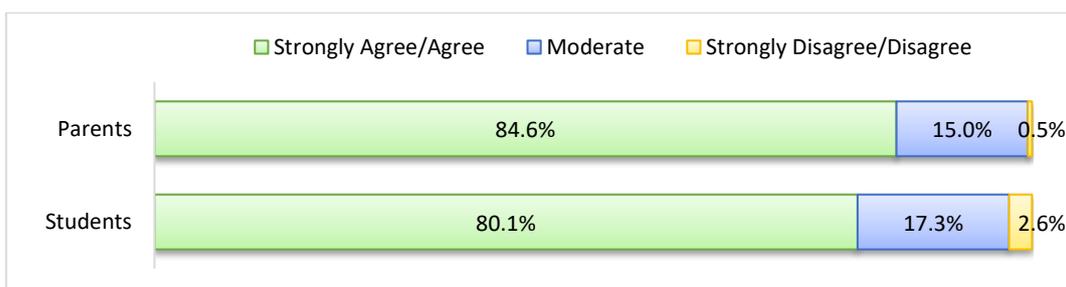
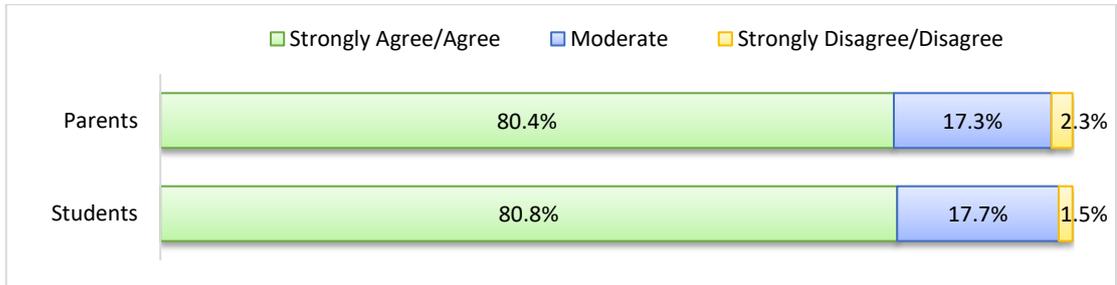


Chart 2. Students had actively participated in IT Class activities



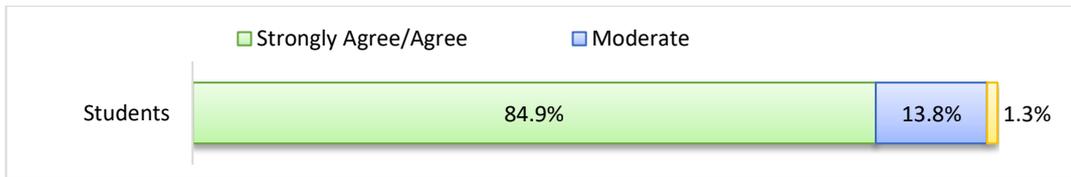
(b) Increased students' interests in IT

Chart 3. Implementation of IT Class increased students' interests in IT



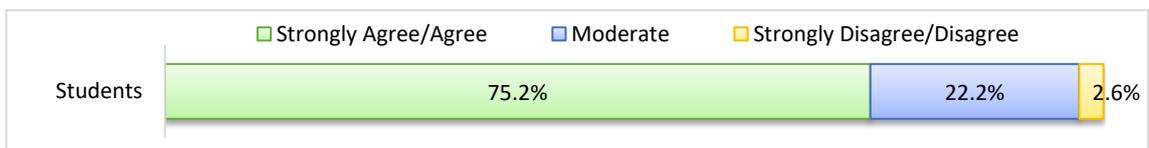
(c) Enhanced students' IT skills

Chart 4. IT Class had enhanced students' IT skills



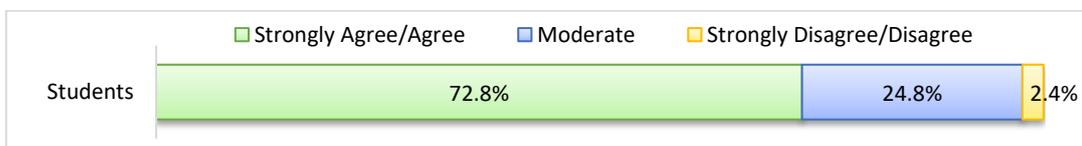
(d) Stronger ability to apply computational thinking, logical thinking, and IT skills in studies and participating in competitions

Chart 5. Stronger ability to apply computational thinking and logical thinking in studies or in competitions



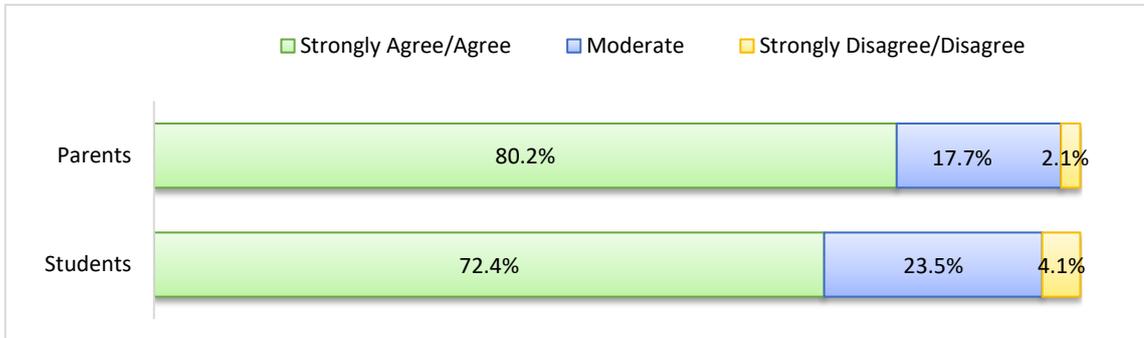
(e) Stronger ability to apply the IT knowledge and skills learnt from IT Class in solving problems in daily lives

Chart 6. Stronger ability to apply IT knowledge and skills learnt in solving the problems in daily lives



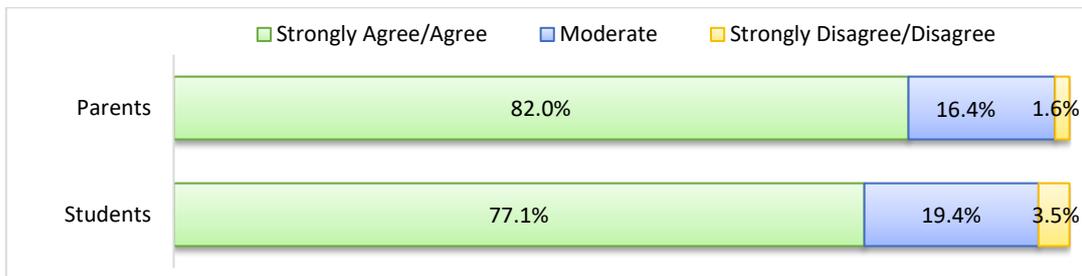
(f) Increased self-confidence in studying IT-related subjects

Chart 7. IT Class enhanced students' self-confidence in studying IT-related subjects



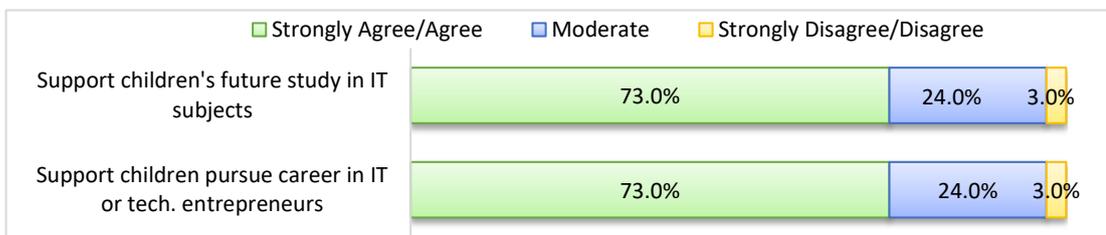
(g) Enhanced understanding towards IT industry and IT career

Chart 8. Enhanced parents' and students' understandings towards IT industry and IT career after participating in IT Class



(h) Parents more supportive in their children further pursuing study or career in IT or technology entrepreneur

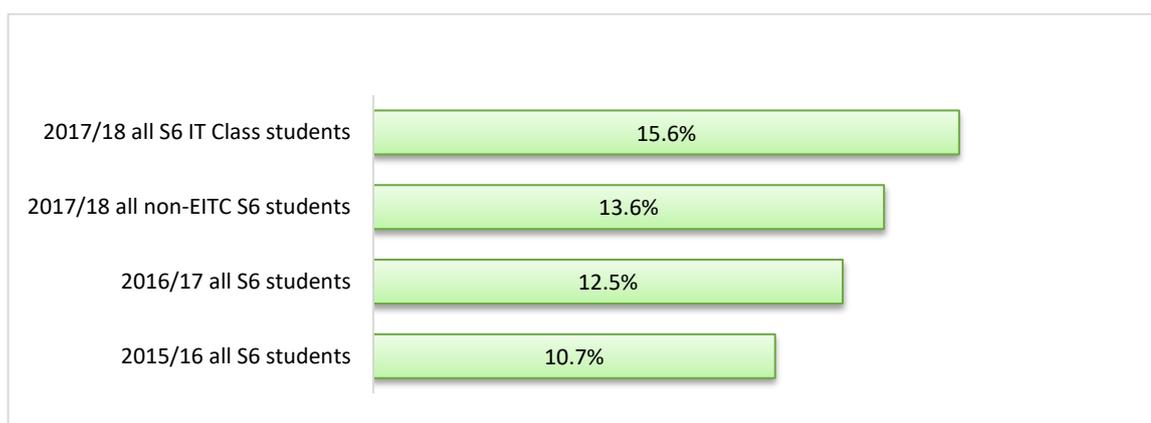
Chart 9. Change of perception of parents



(i) IT Class students choosing IT-related programmes for further study

By the end of the 2017/18 school year, a total of 48 S6 students who have participated in the EITC of the two partner schools since the beginning have graduated. Among the graduates, around 15.6% chose an IT-related tertiary study programme, which was slightly higher as compared with around 13.6% for non-EITC S6 graduates of the two partner schools in the 2017/18 school year and around 12.5% for all S6 graduates in the same schools in the 2016/17 school year before the implementation of EITC. Due to the small sample size of only one cohort of students from the two schools, this finding cannot conclusively indicate EITC's capacity to direct students towards IT-related higher education.

Chart 10. The percentage of S6 students who choose IT-related programmes for further study



Base: Data collected from all 45 S6 IT Class students from 2 EITC schools with IT Class in S6 in 2017/18 SY, Pui Ching Middle School and Shun Tak Fraternal Association Yung Yau College, all non-EITC S6 students of those two schools in 2017/18 SY (286 students), all S6 students of those two schools in 2016/17 SY (335 students) and 2015/16 SY (347 students).

2.2.8 Some partner schools suggested that more flexibility and autonomy should be given to the schools, including class level, class size, curriculum / teaching modules and teaching hours. Also, they suggested that more opportunities should be given to IT Class students to engage and understand the IT industry.

2.2.9 Some stakeholders were of the view that funding resources should not be confined to only eight partner secondary schools. On the other hand, some commented that the EITC model could not be applied to all schools given the difference in commitment, teachers’ expertise, resources and capacities of the individual schools.

2.3 Implementation of EITA

2.3.1 OGCIO originally planned to sponsor up to 30 EITA per year to organise IT activities with a maximum funding support of \$50,000 per activity.

2.3.2 However, in the first round of call for application for EITA for activities to be conducted in the 2015/16 to 2016/17 school years, there were 96 applications, a response that was better than expected. To benefit more students, OGCIO approved 85 applications in total. The second round of call for application for EITA was held in the 2017/18 school year for the 2017/18 to 2018/19 school years. A theme of “Virtual Reality (VR) and Augmented Reality (AR) in Education” was adopted. A total of 194 applications were received and 89 applications were approved. Details of the two rounds of applications are set out below –

	No. of Received Applications	No. of Approved Applications
Call for Application in 2015/16	96	85
Call for Application in 2017/18	194	89
Total	290	174

2.3.3 In total, 142 secondary schools and over 20 000 students have participated in the various IT activities organised under the programme in the period from the 2015/16 to 2018/19 school year. The topics and types of activities covered are summarised below –

EITA in 2015/16

IT Topic	No. of Activities
Robotics	28
3D Modeling	18
Aerial Photography	17
Mobile Apps	13
IoT	10
Virtual Reality	4
Smart Home	2
Digital Games	1
Total :	93

Note : One activity may involve more than one IT topic.

EITA in 2017/18

IT Topic	No. of Activities
AR + VR	49
VR only	34
AR only	6
Total :	89

Types of EITA activities (by percentage of student participants)



Note: The sum of percentages do not add up to 100% as multiple answers were allowed in the questionnaire.

2.3.4 OGCIO planned to sponsor up to around 30 EITA per year and allocated \$15M (about 20% of the \$75M programme funding) to EITA. Details of the two rounds of applications approved are at [Annex 2](#).

2.3.5 According to the reports submitted by 85 participating schools for the 2015/16 and 2016/17 school years, most of them have spent between \$40,360 and \$65,170. 24% of them were required to top up using their own resources. The average funds used per school was \$49,297.

2.3.6 According to the reports submitted by 36 participating schools for the 2017/18 and 2018/19 school years, all of them have spent between \$46,875 and \$71,247. 22% of them were required to top up using their own resources. The average funds used per school was \$51,347.

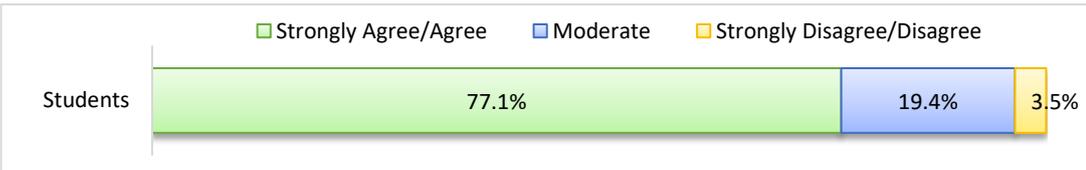
2.3.7 Most participating schools agreed that EITA provided more opportunities to equip students with updated IT knowledge and skills and provided an additional funding source to promote IT learning in secondary schools. EITA was also considered conducive to fostering an IT learning atmosphere in schools and increasing students’ interest and knowledge in IT. These have been supported by the quantitative findings of the survey study as following –

(a) Increased students’ interest in IT

Chart 11. Enhanced students’ interest in IT (by post-activity survey)

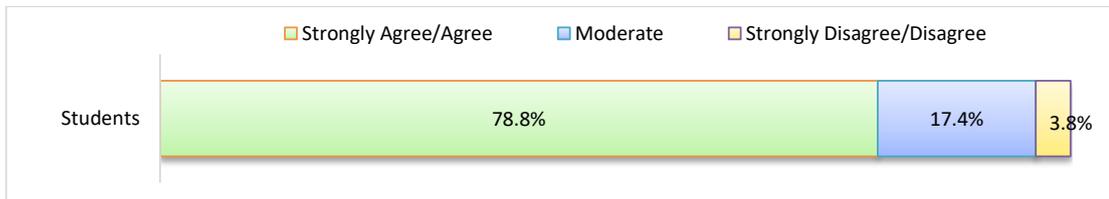


Chart 12. Enhanced students’ interest on IT (by review survey)



(b) Enhanced students' understandings towards IT knowledge

Chart 13. Enhanced students' understandings towards IT knowledge



(c) Activities are worth organising regularly

Chart 14. Worth organising regularly



2.3.8 Most stakeholders considered that funding support should be increased to benefit all secondary schools so as to further strengthen the promotion of IT learning in the school community. In addition, they also suggested that flexibility and autonomy should be provided to schools to organise IT-related activities that best meet the schools and students' needs and abilities.

2.4 Recent Initiatives Introduced by Education Bureau

2.4.1 Strengthening the promotion of popular science education and “Science, Technology, Engineering and Mathematics” (STEM) education is among the eight major areas to promote I&T development put forth by the Chief Executive in her 2017 Policy Address¹.

2.4.2 In the past few years, the Education Bureau has launched / will launch a number of initiatives to enhance the use of IT in education and to promote STEM education –

¹ The eight major areas include increasing resources for research and development; pooling together technology talent; providing investment funding; providing technological research infrastructure; reviewing existing legislation and regulations; opening up government data; Government to lead changes to procurement arrangements; and popular science education.

- (a) The Fourth Strategy on IT in Education (ITE4);
- (b) One-off Grant to Secondary Schools for the Promotion of STEM Education;
- (c) The Dedicated Funding Programme for Publicly-funded Schools under the Quality Education Fund; and
- (d) Life-wide Learning Grant (to be implemented starting from the 2019/20 school year).

It should be noted that these initiatives are mainly related to e-learning, teaching-related and curriculum-based activities in the classroom, which also cover IT and other non-IT technology areas like humanities, physical and aesthetic development, moral and civic education, etc.

3. Conclusion and Way Forward

EITC

- 3.1 According to the survey results, EITC has created a favourable IT learning atmosphere in schools, nurtured students' knowledge and ability in IT and enhanced students and parents' perception and understanding of the IT industry and career.
- 3.2 Given the limited number of EITC graduates available for review, we have yet to conclusively prove the practical effectiveness of EITC in encouraging secondary school graduates to pursue IT programmes in post-secondary education and an IT career. The EITC will thus continue to be run in the eight partner schools until the end of the pilot programme.
- 3.3 In view of the opinions of the partner schools, some slight adjustments will be introduced to streamline and enhance the operation of the IT Classes in individual schools. Collaboration with the industry will be strengthened in order to provide students with more opportunities to take part in activities such as lectures, workshops and new technology experiences and learn about the latest development of the industry.

3.4 Meanwhile, the Technological Advancement Grant (maximum \$0.75M per school) under EITC will be released starting from the 2019/20 school year to address the need of the partner schools in maintaining and updating their IT resources (IT facilities, hardware and software) to support the continual operation of the IT Classes.

EITA

3.5 According to the survey results, EITA is an additional funding source to promote IT learning in secondary schools. This enabled schools to provide more opportunities to update students on latest IT knowledge and skills. Besides, EITA has contributed to nurturing an IT learning atmosphere in schools and successfully raised students' interest and knowledge in IT.

3.6 Most stakeholders supported EITA and suggested to enhance EITA by expanding the funding support to cover all publicly funded secondary schools and with more flexibility and autonomy provided to schools to organise different IT-related activities.

Overall Assessment

3.7 In this Internet-driven digital age, IT is an important pillar in promoting innovation and technology (I&T) development in various areas. With the wide adoption of IT across different areas and sectors, the demand for IT talent in Hong Kong and other places is strong and ever-increasing. There is a need to enhance the interest of young people (including secondary school students) in IT and innovative thinking and foster an IT learning atmosphere to encourage them to choose technology-related tertiary education programmes and pursue an I&T career in the future.

3.8 The interim review of outcomes and effectiveness of implementation of EITP were conducted through both qualitative and quantitative analysis. The stakeholders consulted included teachers, students and their parents of the participating schools, secondary school councils, tertiary institutions, the IT industry and IT-education related associations. Overall speaking, the objectives of EITP have been achieved to a large extent, especially in creating an IT learning atmosphere and enhancing students' knowledge and ability in IT. The stakeholders generally agreed that students' participation

in IT activities outside classroom learning helped arouse their interest in learning IT and cultivate their creativity and logical thinking. They also hoped that the programme could be extended to all schools in order to strengthen and promote popular IT education.

Way Forward

- 3.9 Considering the positive results achieved by the EITA model and taking into account the initiatives launched by the Education Bureau in recent years, we see merits in expanding the EITA to cover all publicly funded secondary schools and enhance government's funding support so that all secondary school students can benefit. As a result, the new "IT Innovation Lab in Secondary Schools" initiative was announced in the 2019-20 Budget to replace the EITA component of the EITP. The new scheme is expected to be launched in the coming 2019/20 school year.
- 3.10 The funding provision of the EITP will be increased by \$500 million so as to provide some 500 publicly funded secondary schools each with a funding support of up to \$1 million to establish an IT Innovation Lab and organise IT-related activities in the coming three school years from 2019/20 to 2021/22. Similar to EITA, the new scheme will be voluntary in nature. The funding support will also cover the expenditures to upgrade their IT equipment and facilities. With a much stronger funding support and more autonomy for participating schools in terms of use of funding, types and timing of activities, it is expected that the momentum and impact of the EITA would be sustained and amplified through the new scheme.
- 3.11 Having regard to the above, the framework of the current EITC with the eight partner schools will continue until the end of the pilot programme.

Office of the Government Chief Information Officer

May 2019

Annexes

Annex 1 – Survey Coverage

Annex 2 – Expenditure Summary of the Enriched IT Programme in Secondary Schools

Interim Review of the Enriched IT Programme in Secondary Schools Survey Coverage

1. Three focus group discussions were held in September 2018 for the then EITP Steering Committee², School Councils of secondary schools and heads of Computer Science or related departments of Tertiary Institutes. Each group discussion lasted for 2 hours.

The then EITP Steering Committee:

➤ IT Industry:

- Google
- Microsoft
- IBM

➤ IT education related associations:

- Association of IT Leaders in Education (AiTLE)
- The Hong Kong Association for Computer Education (HKACE)
- The Hong Kong Academy for Gifted Education (HKAGE)

School Councils:

- Hong Kong Association of Heads of Secondary Schools
- Association of Principals of Government Secondary Schools
- Association of English Medium Secondary Schools

Heads of Computer Science or related Departments of Tertiary Institutes or their representatives:

- The University of Hong Kong (HKU)
- The Chinese University of Hong Kong (CUHK)
- Hong Kong University of Science and Technology (HKUST)
- Hong Kong Baptist University (HKBU)
- The Hong Kong Polytechnic University (PolyU)
- City University of Hong Kong (CityU)
- Education University of Hong Kong (EduHK)
- The Open University of Hong Kong (OUHK)
- Vocational Training Council (VTC)

² A Steering Committee was set up in August 2014 to steer and monitor the implementation of the Enriched IT Programme, including representatives from the IT Industry, IT education related organisations, academia, OGCIO and EDB.

2. All schools participating in EITC and EITA were invited to participate in the Survey. The respective Surveys are summarised as follows:

EITC

➤ In-Depth Interview

- Totally eight in-depth interviews covering principals / representatives of principals of the 8 EITC partner schools were conducted in November 2018. The length of the in-depth interviews was around 75 – 90 minutes and was conducted through face-to-face interview.

➤ Focus Group Discussion

- Two focus groups (each lasted for around 2 hours) covering teachers-in-charge and/or supporting teachers of the 8 EITC partner schools were conducted in November 2018.
- One school was not able to participate in the focus group discussion, a separate telephone interview was arranged and the opinions provided by the school were incorporated into the focus group discussion summary.

➤ Questionnaire

- The questionnaires were conducted in the forms of the online survey and paper survey. The maximum length of the questionnaire was no more than 10 minutes of answering time. The sample size of the questionnaires for EITC was listed as follows:

IT Class Students and Parents of IT Class Students (online survey):

- All students who participated in IT Class from school year 2015/16 to 2017/18 and their parents were invited to participate in the survey. 463 students who had participated in the EITC IT Class from school year 2015/16 to 2017/18 and 434 parents have completed the questionnaires.

Teachers-in-charge and/or Supporting Teachers (paper survey):

- All teachers of the 8 EITC partner schools who were the teachers-in-charge and/or supporting teachers of the IT Class were invited to participate in the Survey. A total of 18 teachers from the 8 EITC partner schools had provided response.

School Principals and Representatives of Principals (paper survey):

- All 8 principals / representatives of principals from each of the 8 EITC partner schools were invited to complete questionnaires during the in-depth interviews.

➤ School Reports

- The qualitative and quantitative data from the spreadsheets and reports submitted by the 8 EITC partner schools for the 2015/16, 2016/17 and 2017/18 school years were analysed, including Annual Performance Reports, Income and Expenditure Statements, Inventory Lists and Activity Reports.
- The analysis also made reference to the Planning Documents of the 8 EITC partner schools for the 2018/19 school year, including Promotion and Recruitment Plan, Resources Plan, IT Activity Plan, Work Appreciation Activity Plan and Module Teaching Plan.
- Historical data such as number of students who have selected Information and Communication Technology as one of their elective subjects in senior forms, HKDSE results, number of S6 students choosing IT-related programmes for further study upon graduation were collected from the corresponding partner schools.

EITA

➤ Questionnaire

- All 142 secondary schools who had joined the EITA programme in past 4 school years (2015/16 – 2018/19) were invited to participate in the Survey and to complete the questionnaires, which were conducted

in the form of online survey. The maximum length of the questionnaire was no more than 10 minutes of answering time.

- The sample size of the questionnaires for EITA was listed as follows:
 - A total of 3 244 EITA students and 54 EITA teachers had provided responses to the post-activity questionnaires.
 - In addition, 288 students who had participated in EITA activities, 150 parents whose children had participated in the EITA activities and 35 teachers who were the teacher-in-charge or the supporting teachers of the EITA had provided response to the online survey.

➤ School Reports

- The qualitative and quantitative data from the spreadsheets and reports submitted by 121³ secondary schools participated in EITA were analysed, including Programme Evaluation Reports, Financial Reports and Inventory Lists.

³ Number of reports received as at the time of analysis by the contractor

**Expenditure Summary of the
Enriched IT Programme in Secondary Schools**

Enriched IT Programme in Secondary Schools

	Allocation	Expenditure as at Mar 2019
Enriched IT Class Programme	\$57M	\$30.3M
Enriched IT Activities Programme	\$15M	\$8.6M
Promotion and other operating expenses	\$3M	\$0.7M
Total :	\$75M	\$39.6M

(a) Enriched IT Class Programme

	Allocation	Expenditure as at Mar 2019
Facilities Grant to partner schools	\$8M	\$7.3M
Class Grant to partner schools	\$43M	\$23M
Technological Advancement Grant	\$6M	0
Total:	\$57M	\$30.3M

(b) Enriched IT Activities Programme

	No. of Approved Applications	Funding Disbursed
Call for Application in 2015/16	85	\$4.2M
Call for Application in 2017/18	89	\$4.4M
Total:	174	\$8.6M