LCQ10: Nurturing and attracting innovation and technology talents

Following is a question by the Hon Elizabeth Quat and a written reply by the Secretary for Education, Dr Choi Yuk-lin, in the Legislative Council today (February 26):

Question:

There are views that in order to realise the vision of developing Hong Kong into an international innovation and technology (I&T) centre, as well as to develop new quality productive forces and promote sustainable economic development, Hong Kong needs to nurture and attract sufficient I&T talents. In this connection, will the Government inform this Council:

(1) of the respective numbers and ratios of senior secondary students who took the subjects of Physics, Chemistry, Biology and the Extended Part of Mathematics, as well as those who took two or more of the above subjects at the same time in the past three school years;

(2) of the measures the Government has put in place to encourage students to take science subjects including Physics, Chemistry, Biology and the Extended Part of Mathematics, etc, so as to further nurture local I&T talents;

(3) as there are views that in order to realise Hong Kong's positioning as centres for development in eight key areas as set out in the Outline of the National 14th Five-Year Plan, relevant human resources plans are a crucial complementary part, of the Government's plans in place to further nurture and attract talents, so as to achieve the objectives of the relevant human resources plans;

(4) as there are views that artificial intelligence (AI) has become a major element required for future development, whether the Government will study making coding and AI applications compulsory subjects in primary and secondary schools and provide relevant teaching guidelines for teachers; if so, of the details; if not, the reasons for that;

(5) as there are views that there is currently a shortage of teachers in STEAM (Science, Technology, Engineering, the Arts and Mathematics) education, whether the Government will consider introducing AI-assisted teaching and "Massive Open Online Courses" (i.e. opening up courses to a large number of online users for participation in learning through the Internet) to enable students to receive multi-model software application training online and equip themselves early, so as to meet the needs of the future job market; and

(6) as there are views pointing out that at present, generative AI has already been integrated into life, for example, free chatbots such as DeepSeek can be downloaded and used free of charge on the Internet, whether

the authorities will consider providing teaching guidelines for teachers to make full use of AI-assisted teaching, such as allowing AI to act as classroom assistants and assist teachers in drawing up curriculum frameworks, and at the same time encouraging students to interact with AI, so as to enable students to master as early as possible the skills of using AI?

Reply:

President,

The government continues to proactively promote science and mathematics education in primary and secondary schools, and strengthen digital education so as to provide talent support for developing Hong Kong into an international innovation and technology (I&T) hub as well as fully implementing the national strategies of invigorating the country through science and education, strengthening the nation with talents, and driving development through innovation. The Education Bureau (EDB), by optimising the curriculum and enhancing teacher training, creates a learning atmosphere of science and I&T in schools and cultivates students' interest and ability in learning mathematics, science and technology from an early age, as well as their digital literacy, fostering their aspirations in science and I&T, and enabling students to embrace the opportunities brought by the development of I&T and meet the requirements of the future workplace.

Regarding the various parts of the question raised by the Hon Elizabeth Quat, our reply is as follows:

(1) and (2) Following the implementation of the optimisation measures for senior secondary curriculum introduced by the EDB in the 2021/22 school year, which has provided students with more space, the number of students taking three elective subjects at the senior secondary level has increased significantly. Among them, the number and percentage of students taking Physics, Chemistry, Biology and the Mathematics Extended Modules (M1/M2), as well as those taking two or more of these subjects have shown a steady increase from the 2021/22 school year to the 2023/24 school year. Details are as follows:

School Year	Number (Percentage) of Secondary Four Students				
	Biology	Chemistry	Physics	Extended Part of Mathematics	Taking two or more elective subjects in science and mathematics
2021/22	16 980 (34.4%)	16 115 (32.7%)	12 769 (25.9%)	9 701 (19.7%)	17 104 (34.7%)
2022/23	17 419 (34.6%)	16 625 (33.1%)	12 880 (25.6%)	10 098 (20.1%)	17 832 (35.5%)

2023/24	17 647 (35.0%)	16 714 (33.1%)	13 034 (25.8%)	10 466 (20.8%)	18 226 (36.1%)

Source:
The Survey on Senior Secondary Subject Information conducted by the EDB. The data is provided by approximately 440 schools (including government and aided secondary schools, caput schools, and secondary schools under the Direct Subsidy Scheme) offering the local senior secondary curriculum. Data for the 2024/25 school year is still being collected.

The EDB is taking a multi-faceted approach to strengthen students' foundation in science and mathematics so as to further nurturing local I&T talents. In respect of curriculum, the EDB will continue to optimise the curriculum, including reviewing the current senior secondary curricula of Physics, Chemistry and Biology, and enhancing I&T elements. We are also strengthening mathematics education by launching more school support programmes on promoting mathematical modelling education, fostering students' ability to apply mathematics and their interest in learning mathematics.

Regarding teacher training, the EDB continuously organises professional development programmes in science, mathematics, and I&T for teachers, enabling teachers to stay abreast of the latest developments in I&T and incorporate innovative elements into classroom teaching. Topics in these programmes cover biotechnology, robotics, energy technology, and mathematical modelling, with an aim to enrich students' learning experiences.

On student activities, we continue to collaborate with I&T related organisations, such as tertiary institutions, Cyberport, professional engineering bodies, and the Hong Kong Academy for Gifted Education, to provide students with I&T related experiential activities, lectures, competitions, and training programmes both within and beyond the classroom. Examples include the Distinguished Lecture Series on Applications of Mathematics in STEAM World, the Hong Kong Student Science Project Competition, and the Innovative Engineering Education Programme for Primary and Secondary Schools. All these initiatives aim to inspire students to pursue careers in scientific research and I&T, so as to meet the future demand for innovative talents in society.

We will set up an ad hoc committee under the Curriculum Development Council Committee on Science Education to engage various stakeholders in exploring options for further optimising science education.

(3) Education is the key to nurturing talents. For the University Grants Committee (UGC)-funded universities, the Government has set the target in the 2022 Policy Address to continue to enhance post-secondary education by encouraging them to offer programmes with greater relevance to future economic development, such that students from the UGC-universities studying in disciplines relevant to the "eight centres" will reach around 60 per cent by the 2026/27 academic year. Through the triennial Planning Exercise of UGC,

the UGC-funded universities will offer more new programmes relevant to the "eight centres" in the 2025-28 triennium, thereby nurturing more talents to meet the development needs of Hong Kong and creating impetus for the development of the "eight centres".

(4), (5) and (6) The promotion of digital education (including artificial intelligence (AI)) in primary and secondary schools by the EDB focuses on enhancing students' digital literacy and laying a solid foundation for the development of digital skills, nurturing students to become responsible citizens and lifelong learners.

To encourage schools to adopt AI in supporting teaching, the EDB launched the "AI for Science Education" Funding Programme on a pilot basis for Junior Secondary Science in the end of 2024. This funding programme is open to applications from publicly funded secondary schools. Successful applicant schools will receive a one-off grant of $100,000 to arrange for science teachers to enroll in training courses offered by tertiary institutions or relevant professional bodies, fostering pedagogical innovation.

To enable students to master coding and AI skills from an early age, the EDB has launched the "Module on Artificial Intelligence for Junior Secondary Level" and the "Enriched Module on Coding Education for Upper Primary Level" in 2023, which further cultivate students' computational thinking more systematically and enhance students' understanding of the foundation and application of AI. The curriculum modules include suggestions and guidelines of learning and teaching for teachers' reference. Almost all publicly-funded schools have implemented the enriched coding education and AI education in upper primary level and junior secondary level respectively.

Regarding teacher training, the EDB continues to provide professional development programmes related to coding and AI. These programmes focus on guiding students to effectively utilise I&T and information technology tools to solve problems, thereby enhancing learning and teaching effectiveness. The training courses also cover the application of AI tools in teaching across various subjects, including helping teachers master essential skills to teach students how to effectively pose questions to generative AI tools, enabling them to fully leverage AI to support teaching. The courses also share the good practices from schools on integrating AI technology into teaching, such as using these tools to design lesson plans and develop teaching materials. Additionally, the training assists teachers in developing school-based arrangements or guidelines for the use of AI, tailored to their specific teaching contexts. The training courses are conducted in both online and offline modes to benefit a greater number of teachers.

With regard to e-learning platforms and resources, the Quality Education Fund of the EDB has reserved $500 million to provide schools with a total of 22 projects, which have commenced at the beginning of the 2023/24 school year. The projects will deploy innovative technologies such as big data and AI to enhance learning and teaching effectiveness in a wide array of subjects/areas, including mathematics and science education, coding,

robotics. It is expected that in mid-2025, the deliverables of projects will be successively released for use by schools. In addition, we are collaborating with the Hong Kong Education City to launch an online learning platform on AI and computational thinking, as well as a webpage featuring expert lecture videos by 2025, aiming to promote self-directed online learning among students (including learning the application of various software).

The higher education in Hong Kong has always been bold in innovation and growing together with technological development. With the advent of generative AI, innovative and breakthrough technologies have presented new challenges and enormous opportunities in transforming pedagogies and student learning experiences. To this end, the UGC, with the support from the Quality Assurance Council, has allocated $100 million to set up the Fund for Innovative Technology-in-Education to provide impetus for universities to harness innovative and breakthrough technologies in transforming pedagogies and enriching student learning experiences, and to nurture a digitally competent and technologically responsible generation, for the future success of their students in the digital economy. Universities also actively explore the application of AI in teaching and learning, such as providing AI learning tools and introducing AI lecturers, etc. In addition, a number of universities are currently providing Massive Open Online Courses for students from all over the world to study programmes online, with some being free of charge. Through a more flexible and innovative learning mode, these courses provide a more convenient progression pathway for students who aspire to self-enhancement.