Hong Kong SAR

Frederick Koon Shing Leung
Maurice M W Cheng
The University of Hong Kong

Hak Kwong Yip
Ruby Kam Man Leung
Policy 21 Limited

Introduction

Overview of Education System

Before the implementation of the new education system in the 2009–2010 academic year, the education system in Hong Kong SAR followed the typical English system (a 6-5-2-3 structure, comprising six years of primary school, five years of secondary school, two years of matriculation course, and three years of university study). In 2000, the Education Commission recommended a 3+3+4 academic system, comprising three years of junior secondary education, three years of senior secondary education, and four years of undergraduate education, to facilitate the implementation of a more flexible, coherent, and diversified senior secondary curriculum.[1]

In the 2009–2010 academic year, the Hong Kong education system adopted a 6-3-3-4 academic structure: six years of primary school, three years of junior secondary school, three years of senior secondary school, and four years of university study. The age of entry into primary school is 6. Free, universal, and compulsory primary and junior secondary education was introduced in 1978. Free education was extended to 12 years to cover senior secondary education beginning in the 2008–2009 academic year.

Before reaching age 6, children may attend kindergarten provided by private operators in accordance with the rules and regulations stipulated by the Education Bureau (EDB). Although kindergarten is not part of the free or compulsory education system in Hong Kong, the participation rate is over 100 percent, meaning that virtually all parents enroll their children in kindergarten. To ensure that no child is deprived of access to kindergarten education due to the lack of means, parents who are financially in need may apply for additional assistance under a fee remission scheme when their children are enrolled in a kindergarten covered by the scheme.[2]

Kindergarten education in Hong Kong is for children 3 to 6 years old. Local nonprofit kindergartens joining the kindergarten education scheme receive a direct government subsidy. At the primary and secondary levels, public schools provide the majority of school placements. These schools consist of government schools operated directly by the government and aided schools that

are generally run by religious or charitable organizations, fully subvented by the government, and managed by incorporated management committees or school management committees. In addition, Direct Subsidy Scheme (DSS) schools that can charge school fees and receive government subvention based on enrollment and self-financed private schools provide alternatives to parents.

The government is committed to developing a vibrant international school sector mainly to meet the demand for international school placements from nonlocal families living in Hong Kong and families coming to Hong Kong for work or investment. In the 2018–2019 school year, there were 54 international schools in Hong Kong that generally operate on self-financing and offer different nonlocal curricula.

At the tertiary level, both publicly funded and self-financing post-secondary programs are available at subdegree, undergraduate, and higher levels. Publicly funded programs are provided by the eight University Grants Committee-funded universities, the Hong Kong Academy for Performing Arts, and the Vocational Training Council. Diverse, publicly funded, and self-financing post-secondary programs are provided by various post-secondary institutions with a choice of study pathways that have multiple entry and exit points.

Several bodies play an important role in the planning and administration of the education sector. EDB is responsible for formulating, developing, and reviewing policies, programs, and legislation from the preprimary to tertiary levels, as well as overseeing the effective implementation of educational programs. EDB also monitors the services provided by the University Grants Committee, the Student Financial Assistance Agency, the Hong Kong Examinations and Assessment Authority, the Hong Kong Council for Accreditation of Academic and Vocation Qualifications, and the Vocational Council.[3]

The concept of school curriculum refers to the totality of students' learning experiences. It goes beyond the learning of mere subjects to include the wide array of learning experiences provided for students at different stages of education. In Hong Kong, since the curriculum reform in 2001, the school curriculum has been advocating "learning to learn" and developing students' self-directed and lifelong learning capabilities.

The school curriculum has also been promoting generic skills and prioritizing values and attitudes that broadly align with many of the 21st century skills and attributes valued by the international community. The Hong Kong school curriculum promotes nine generic skills: Basic Skills (Communication, Numeracy/Mathematical, Information Technology), Thinking Skills (Critical Thinking, Creativity, Problem Solving), and Personal and Social Skills (Self-management, Study/Self-learning, Collaboration).[4]

The learning goals of primary schools are to focus on promoting the whole-person development of students, which includes enhancing students' proficiency in English and Chinese (including Putonghua), strengthening their self-directed learning skills, developing their potential, and helping them to adopt a healthy lifestyle. Thus, the overarching principle of curriculum development is to support students in learning how to learn.

The term "curriculum" is defined as the total learning experiences students gain from school. All students are expected to have five essential learning experiences for whole-person development: Moral and Civic Education, Intellectual Development, Community Service, Physical and Aesthetic Development, and Career-related Experiences.

The curriculum framework comprises three interconnected components: Key Learning Areas; Generic Skills; and Values and Attitudes. This framework enables schools to organize and offer learning experiences at different paces, adjust the breadth and depth of learning content, and flexibly adopt a range of learning strategies and modes to maximize learning and teaching effectiveness. At the primary education level, the key learning areas cover Chinese language, English language, mathematics, general studies (including science), arts education, and physical education.

Building on the foundation developed in primary education, the school curriculum for secondary education covers eight Key Learning Areas at the junior secondary education level to help students build a solid knowledge foundation and prepare them for studying the senior secondary education curriculum, which is made up of core subjects and elective subjects for diversification and specialization.[5] The eight Key Learning Areas are as follows:

- Chinese Language
- English Language
- Mathematics
- Personal, Social, and Humanities Education
- Science
- Technology
- Arts Education
- Physical Education

The senior secondary education curriculum, an extension of the curriculum in primary and junior secondary education, is broad and balanced with diversification and specialization. It promotes students' capabilities in learning to learn and is developed from the prior knowledge of the eight Key Learning Areas and learning experiences students have acquired, with an emphasis on positive values and attitudes.

The senior secondary education curriculum is made up of core subjects, elective subjects, and other learning experiences. All students should study the four core subjects, and two or three elective subjects (up to a maximum of four). The four core subjects are Chinese language, English language, mathematics, and liberal studies. Students can select two or three elective subjects from 20 elective subjects under the eight Key Learning Areas, Applied Learning, or Other Languages (including French, German, Japanese, Spanish, Hindi, and Urdu).

Students' learning experiences are organized within the school curriculum framework to include knowledge, generic skills, values, and attitudes spanning the five essential learning experiences, to achieve seven updated learning goals of secondary education, including whole-

person development and nurturing students' lifelong learning, as well as developing their capabilities in learning to learn.

Chinese and English are the official languages of Hong Kong. Most people in Hong Kong speak Cantonese, a Chinese dialect. The government has adopted a biliterate (Chinese and English) and trilingual (Putonghua, Cantonese, and English) policy for education in Hong Kong. At the primary level, there is no specific policy on language of instruction. Most local primary schools in Hong Kong use Chinese (Cantonese) as the medium of instruction. Schools may choose to use Putonghua to teach Chinese language subjects.[6]

Marking the explicit enforcement of mother tongue teaching, a new *Guidance* was promulgated in 1997. According to the *Guidance*, schools wishing to use English as the medium of instruction must demonstrate their fulfillment of three prescribed criteria: student ability, teacher capability, and support measures. As a result, 112 public sector secondary schools were allowed to use English as their medium of instruction, while some 300 schools used Chinese as their medium of instruction.[7]

The fine-tuned medium of instruction arrangements was introduced in the 2010–2011 academic year, with schools adopting a student-centred approach to devise diversified medium of instruction arrangements to meet their students' needs. The objectives are to enrich the English language environment within schools and to enhance opportunities for students to use and be exposed to English. The criteria adopted by schools in devising the arrangements are students possessing the ability to learn through English, teachers possessing the capability to teach through English, and schools with adequate support strategies/measures in place.[8]

At junior secondary levels, all schools may have the discretion to adopt Chinese as the medium of instruction for all nonlanguage subjects. Schools meeting the "student ability" criterion may, with regard to their own circumstances and the needs of their students, exercise professional discretion to put in place the most appropriate medium of instruction arrangements, such as adopting English as the medium of instruction for all nonlanguage subjects or adopting Chinese as the medium of instruction for some nonlanguage subjects.

Schools not meeting the "student ability" criterion may, for each class/group of students, dedicate only up to 25 percent of the total lesson time (excluding the lesson time for the English language) to extended learning activities in English, or dedicate all 25 percent or a smaller percentage to English teaching of up to two nonlanguage subjects (i.e., "allocation of time to subjects"). If schools implement both arrangements of extended learning activities in English and "allocation of time to subjects," the lesson time involved together must not exceed 25 percent of the total lesson time (excluding the lesson time for the English Language).[9]

At the senior secondary level, schools should be better informed to judge professionally whether their students have the ability to learn through the English medium. It is also believed that the need to sit for public examinations at the end of senior secondary education would induce schools, parents, and students to make pragmatic and realistic choices of medium of instruction.

Thus, schools that have fulfilled the prescribed criteria with respect to teacher capability and support measures may be given more flexibility in devising the medium of instruction arrangements.[10]

Use and Impact of TIMSS

Hong Kong took part in IEA's Second International Mathematics Study (SIMS) and Second International Science Study (SISS), as well as TIMSS in 1995, 1999, 2003, 2007, 2011, and 2015. Continued participation in TIMSS 2019 will help produce evidence-based data and provide a longitudinal and cross-level analysis of the trends in mathematics and science achievements in Hong Kong in relation to the global context.

The Hong Kong studies have provided data enabling background information on participating students, teachers, and schools to be analyzed in terms of achievement indicators and helping to explain gaps in mathematics and science achievement. The publication and dissemination of student results from earlier cycles of TIMSS have impacted Hong Kong's mathematics and science education community, as well as the curriculum development process. Workshops have been designed for mathematics and science teachers at the primary and secondary levels based on TIMSS results, targeting areas of student weaknesses in mathematics and science. Participating schools have also received reports on their students' performance for internal reference, which could impact teaching and learning at the school level.

A lesson learned from TIMSS regarding curriculum development is the need for continual updating and renewal of our science curricula, taking into account the context in Hong Kong to ensure that changes are beneficial to learning and teaching. Based on TIMSS findings, TIMSS national research coordinators and other researchers have examined the implications of TIMSS and other international assessments for mathematics and science curriculum development in Hong Kong.

In addition, TIMSS data have also provided valuable insights on the design of professional development programs and the development of teaching strategies. For instance, TIMSS 2011 and 2015 data showed that there were significant differences between genders at Grade 4, with boys performing better than girls in mathematics and science. The same was true for science in 2015 for Grade 8. In light of the gender differences the TIMSS data revealed, teachers have to reflect on their teaching strategies and devise measures in their day-to-day learning and teaching activities.

The TIMSS findings have reminded science teachers in Hong Kong of the need to help students consolidate their learning. Teachers will also have to avoid fragmented teaching by helping students integrate topics learned in different parts of the curriculum holistically.

On the international front, there is keen attention in the education community and beyond focusing on the high achievement in mathematics and science of East Asian students in general and Hong Kong students in particular. A number of papers on this phenomenon have been published in international journals, and the TIMSS Hong Kong research team has been invited to deliver its findings at major national, regional, and international conferences. In addition, a number of master's and doctoral students have written theses and dissertations based on TIMSS data.

The Mathematics Curriculum in Primary and Lower Secondary Grades

The aim of the mathematics curriculum is to develop students' ability to conceptualize, inquire, reason, communicate, formulate, and solve problems mathematically and their appreciation for the aesthetic nature and cultural aspects of mathematics.[11] The central curriculum, in the form of an open and flexible framework, sets out what schools are encouraged to do in helping students develop subject knowledge and skills as embodied in the learning units under different strands or areas, generic skills, and positive values and attitudes. The overall aims of the Mathematics Education Key Learning Area (KLA) curriculum are to develop in students:

- The ability to think critically and creatively; to conceptualize, inquire, and reason mathematically; and to use mathematics to formulate and solve problems in daily life as well as in mathematical contexts and other disciplines
- The ability to communicate with others, express their views clearly and logically in mathematical language
- The ability to manipulate numbers, symbols, and other mathematical objects
- Number sense, symbol sense, spatial sense, measurement sense, and the capacity to appreciate structures and patterns
- A positive attitude toward mathematics learning and an appreciation of the aesthetic nature and cultural aspect of mathematics

At a basic level, the mathematics curriculum is composed of three strands: Number and Algebra; Measures, Shape, and Space; and Data Handling. At the primary level, these three strands are subdivided into five strands: Number; Algebra; Measures; Shape and Space; and Data Handling. The learning targets and objectives, which are geared toward the overall aims of the mathematics education curriculum, are organized progressively and systematically across Key Stage 1 (Primary 1 to 3), Key Stage 2 (Primary 4 to 6), Key Stage 3 (Secondary 1 to 3), and Key Stage 4 (Secondary 4 to 6). Exhibits 1 to 3 list the mathematics topics taught at Key Stage 1 (Primary 1 to 3), Key Stage 2 (Primary 4 to 6), and Key Stage 3 (Secondary 1 to 3).

Exhibit 1: Mathematics Topics Taught at the Primary Level, Grades 1 to 3 (Primary 1 to 3)

Strand	Topics
Number	▪ Numbers to 20 ▪ Basic addition and subtraction ▪ Numbers to 100 ▪ Addition and subtraction (I) ▪ Three-digit numbers ▪ Addition and subtraction (II) ▪ Basic multiplication ▪ Four-digit numbers ▪ Addition and subtraction (III) ▪ Basic division ▪ Five-digit numbers ▪ Multiplication (I) ▪ Division (I) ▪ Four arithmetic operations (I) ▪ Fractions (I)
Measures	▪ Length and distance (I) ▪ Money (I) ▪ Length and distance (II) ▪ Time (I) ▪ Length and distance (III) ▪ Time (II) ▪ Money (II) ▪ Length and distance (IV) ▪ Time (III) ▪ Capacity ▪ Time (IV) ▪ Weight
Shape and Space	▪ Three-dimensional shapes (I) ▪ Two-dimensional shapes ▪ Directions and positions (I) ▪ Angles ▪ Directions and positions (II) ▪ Quadrilaterals (I) ▪ Three-dimensional shapes (II) ▪ Quadrilaterals (II) ▪ Triangles
Data Handling	▪ Pictograms ▪ Bar charts (I)
Further Learning Unit	▪ Inquiry and investigation

Exhibit 2: Mathematics Topics Taught at the Primary Level, Grades 4 to 6 (Primary 4 to 6)

Strand	Topics
Number	▪ Multiplication (II) ▪ Division (II) ▪ Multiples and factors ▪ Common multiples and common factors ▪ Four arithmetic operations (II) ▪ Fractions (II) ▪ Decimals (I) ▪ Multidigit numbers ▪ Fractions (III) ▪ Decimals (II) ▪ Decimals (III) ▪ Fractions (IV) ▪ Fractions (V) ▪ Decimals (IV) ▪ Decimals (V) ▪ Percentages (I) ▪ Percentages (II)
Algebra	▪ Elementary algebra ▪ Simple equations (I) ▪ Simple equations (II)
Measures	▪ Perimeter (I) ▪ Area (I) ▪ Area (II) ▪ Volume (I) ▪ Angle (degree) ▪ Volume (II) ▪ Perimeter (II) ▪ Speed ▪ Area (III)
Shape and Space	▪ Quadrilaterals (III) ▪ Dissecting and forming shapes ▪ Directions and positions (III) ▪ Circles ▪ Three-dimensional shapes (III) ▪ Symmetry
Data Handling	▪ Bar charts (II) ▪ Bar charts (III) ▪ Averages ▪ Broken line graphs ▪ Pie charts ▪ Uses and abuses of statistics
Further Learning Unit	▪ Inquiry and investigation

Exhibit 3: Mathematics Topics Taught at the Junior Secondary Level, Grades 7 to 9 (Secondary 1 to 3)

Strand	Topics
Number and Algebra	▪ Basic computation ▪ Directed numbers ▪ Approximate values and numerical estimation ▪ Rational and irrational numbers ▪ Using percentages ▪ Rates, ratios, and proportions ▪ Algebraic expressions ▪ Linear equations in one unknown ▪ Linear equations in two unknowns ▪ Laws of integral indices ▪ Polynomials ▪ Identities ▪ Formulas ▪ Linear inequalities in one unknown
Measures, Shapes and Space	▪ Errors in measurement ▪ Arc lengths and areas of sectors ▪ Three-dimensional figures ▪ Mensuration ▪ Angles and parallel lines ▪ Polygons ▪ Congruent triangles ▪ Similar triangles ▪ Quadrilaterals ▪ Centers of triangles ▪ The Pythagorean theorem ▪ Rectangular coordinate system ▪ Trigonometry
Data Handling	▪ Organization of data ▪ Presentation of data ▪ Measures of central tendency ▪ Probability
Further Learning Unit	▪ Inquiry and investigation

The Science Curriculum in Primary and Lower Secondary Grades

The Science Education KLA[12] is an integral part of the school curriculum that provides a range of learning experiences for students to:

- Develop scientific literacy with a firm foundation in science; realize the important relationship among science, technology, engineering, and mathematics; and master integration and application of relevant knowledge and skills across KLAs
- Develop positive values and attitudes for personal development and for contributing to a scientific and technological world in the 21st century

At the primary level, the science learning elements are included in different strands of the General Studies curriculum. Students develop their interest in science and basic scientific knowledge and science process skills to facilitate their progression to learning in secondary schools. At the junior secondary level, the science (S1 to 3) curriculum enables students to further develop their scientific knowledge and skills and provides a firm foundation for them to pursue their studies at the senior secondary level. The updated curriculum emphases are as follows:

- Nurturing students' interest in science and related disciplines
- Emphasizing students' development of scientific thinking and problem-solving skills
- Strengthening students' ability to integrate and apply knowledge and skills (including hands-on skills)
- Fostering students' sense of making informed judgements based on scientific evidence
- Nurturing students to become self-directed learners of science
- Embracing students with different needs and aspirations

At the primary level, the General Studies (GS) curriculum provides opportunities for students to integrate knowledge, skills, and attitudes across three KLAs: Personal, Social, and Humanities; Science; and Technology. Science learning elements are included in different strands of the GS Curriculum. At the junior secondary level, all students study Science (S1 to 3) as a core subject consisting of topics from various science related disciplines.

Science education has an open and flexible curriculum framework. For curriculum planning and organization, the major learning elements of the science curriculum are arranged into six strands: Scientific Investigation; Life and Living; the Material World; Energy and Change; the Earth and Beyond; and Science, Technology, Society, and Environment. Exhibits 4 and 5 list the topics taught under different strands.[13]

Exhibit 4: Science Topics Taught at the Primary Level, Grades 1 to 6 (Primary 1 to 6)

Strand	Topics
Scientific Investigation	▪ Exploring the environment (visiting the park) ▪ Being a scientist *Simple investigations, observations, and interpretations are carried out throughout the primary science curriculum*
Life and Living Things	▪ The body ▪ Healthy living habits ▪ Characteristics of living things ▪ Plants and animals ▪ Personal and environmental hygiene ▪ Food ▪ Growth and reproduction ▪ Air
The Material World	▪ Environmentally friendly practices ▪ Conservation of the environment and natural resources ▪ Matter
Energy and Change	▪ The nature of heat ▪ Saving energy ▪ Motion ▪ Light ▪ Sound ▪ Electricity
Earth and Beyond	▪ The sun, moon, and stars ▪ Day and night ▪ Weather and seasons ▪ Earth ▪ Water and the water cycle ▪ Light ▪ Sound
Science, Technology, and Society	▪ Reuse and recycle ▪ Caring for the environment ▪ Wise use of natural resources ▪ Our society ▪ Hong Kong, China, and the world ▪ Information technology in everyday life ▪ Life and technology ▪ Population ▪ Problems in the world (e.g., famine, war, and poverty) *This strand is applied to most of the science topics in the science curriculum*

Exhibit 5: Science Topics Taught at the Junior (Lower) Secondary Level, Grades 7 to 9 (Secondary 1 to 3)

Strand	Topics
Scientific Investigation	▪ Introducing science (including laboratory safety, laboratory equipment, and conducting experiments) *Scientific investigation is carried out throughout the secondary science curriculum*
Life and Living Things	▪ Plants and animals ▪ Cells and human reproduction ▪ Living things and air ▪ A healthy body ▪ Senses
The Material World	▪ Metals ▪ Plastics ▪ Matter
Energy and Change	▪ Different forms of energy ▪ Energy changes ▪ Fuels ▪ Electricity and circuits
Earth and Beyond	▪ Water, the wonderful solvent ▪ Light and colors ▪ Space travel ▪ Space exploration ▪ Forces ▪ Gravity
Science, Technology, and Society	▪ Materials of the modern world ▪ Environmental problems of waste disposal (e.g., metal, plastics) ▪ Effects of acid rain on the environment ▪ Pollution ▪ Acids and alkalis *This strand is applied to most of the science topics in the science curriculum*

Professional Development Requirements and Programs

To support teacher professional development, the government has accepted the recommendation of the Advisory Committee on Teacher Education and Qualifications, which designates a "soft target" under which all teachers, regardless of rank or duties, are encouraged to undertake no less than 150 continuous professional development hours in each three-year cycle.[14]

Monitoring Student Progress in Mathematics and Science

The emphasis placed on monitoring student progress is on Assessment for Learning as an integral part of the learning, teaching, and assessment cycle. In other words, teachers should use assessments (which may be as simple as effective verbal questioning, or observation of student behavior) and provide immediate feedback to enhance student learning in everyday classroom lessons. The focus is on why students do not learn well and how to help them to improve rather than just using assessments to find out what knowledge students have learned.[15]

Modes of assessment can be divided into the three categories according to the purposes of assessment. First is assessment *of* learning, which is assessment for the purpose of evaluating the quality of education or understanding students' standards. Second is assessment *for* learning, which is assessment for the purpose of helping students to understand their strengths and weaknesses in learning and to make continuous improvement. It also enables teachers to review and adjust their teaching objectives, teaching plans, and teaching strategies. Third is assessment *as* learning, which is assessment for the purpose of enabling students to be more active in connecting learning and assessment, thereby developing their self-directed learning abilities.[16]

At the secondary level, there are added components of self-assessment and peer assessment. Self-assessment involves students examining their own learning performance using a set of explicitly stated criteria. It can take various forms, including teacher-student interviews, self-assessment checklists, reflection logs, writing conferences, and group discussions among students. Peer assessment involves students in evaluating the performance and quality of their peers' work, or the level attained by their peers based on a set of predetermined criteria. The work to be assessed can include test performance, portfolios, oral presentation, and writing. Peer assessment can be done one on one or in small groups.[17]

For mathematics education, teachers must deploy different modes of assessment, focusing on the process, progress, and product of learning mathematics. Various assessment activities can help teachers collect, judge, and interpret information about students' performance in their development of mathematical knowledge and skills, generic skills, and positive values and attitudes. For example, in the learning and teaching of mathematics, there are often discussions, asking and answering of questions between teachers and students or among students. Discussion in class not only enables teachers to discover what students understand about a particular topic, it also provides students with opportunities to present their views and foster their communication skills. Teachers could also understand students' attitudes and abilities in applying thinking skills through class discussions.

Apart from classwork, homework, tests, and examinations, project work is a useful activity to assess students' performance. It is also an effective teaching strategy to promote self-directed learning and enables students to connect their mathematical knowledge, generic skills, values, and attitudes. It can also foster students' critical thinking skills, creativity, and problem solving skills.[18]

For science education, a variety of assessment modes and strategies are needed to truly reflect students' performance or progress in learning science. For instance, written examinations may not fully reflect students' performance in relation to the science process skills in practical work and scientific investigation. Apart from pen and paper tests, oral questioning, or electronic assessment, a comprehensive assessment of students' attitudes and practical skills requires practical assessments over a period of time and is based on students' performance in practical work during class time, in scientific investigations, and on practical tests.

In addition, students must be assessed through project work, which enables them not only to exercise practical skills and apply what they have learned in science and other disciplines, including mathematics and technology, but also to employ various skills and thinking processes, such as identifying problems, formulating hypotheses, designing and implementing strategies, and evaluation.[19]

Special Initiatives in Mathematics and Science Education

To better prepare students for the rapid economic, scientific, and technological developments ahead, science, technology, engineering and mathematics (STEM) education is being promoted as a key to the ongoing renewal of the school curriculum and essential to lifelong learning and whole person development.[20] Apart from cultivating students' interest in science, technology, and mathematics, and developing a solid knowledge base, the aim is to strengthen students' ability to integrate and apply knowledge and skills across different STEM disciplines; nurture their creativity, collaboration, and problem solving skills; and foster their innovation and entrepreneurial spirit as required in the 21st century. The promotion of STEM education in schools is aimed at nurturing a versatile pool of talents with different sets and levels of skills to enhance the competitiveness of Hong Kong.

As part of the efforts in promoting STEM education, there is a plan to update the curricula of the Key Learning Areas concerned to align with the ongoing renewal of the school curriculum with the focus on nurturing students' creativity, collaboration, problem solving skills, and innovativeness through student-centered pedagogies, and pave the way for nurturing students' entrepreneurial spirit in senior secondary subjects such as applied learning courses.

It is also planned to strengthen the provision of quality learning experiences to students through support to schools on whole-school curriculum planning and collaboration with relevant organizations. This approach will be implemented through the hosting of large-scale STEM-related events, competitions, and expos for students.

References

[1] Education and Manpower Bureau, the Government of the Hong Kong Special Administrative Region. (2005). *The new academic structure for senior secondary and higher education—action plan for investing in the future of Hong Kong.* Retrieved from https://www.legco.gov.hk/yr04-05/english/panels/ed/papers/ed0603cb2-embrpt-e.pdf

[2] Legislative Council of the Hong Kong SAR Government. (2016). *Report of the Subcommittee to study the implementation of free kindergarten education, Panel of Education.* Retrieved from https://www.legco.gov.hk/yr15-16/english/panels/ed/ed_fke/reports/ed_fkecb4-532-1-e.pdf

[3] Education Bureau, the Government of the Hong Kong Special Administrative Region. (n.d.). *Bureau information: our work.* Retrieved from https://www.edb.gov.hk/en/about-edb/info/our-work/index.html

[4] Task Force on Review of School Curriculum, the Government of the Hong Kong Special Administrative Region. (2019). *Consultation document.* Retrieved from https://www.edb.gov.hk/attachment/en/about-edb/press/consultation/TF_CurriculumReview_Consultation_e.pdf

[5] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Secondary education curriculum guide, booklet 2: Learning goals, curriculum framework and planning.* Hong Kong: Author.

[6] Education Bureau, the Government of the Hong Kong Special Administrative Region. (2015). *Using Putonghua as the medium of instruction for teaching the Chinese language subject in primary and secondary schools in Hong Kong.* Paper presented to the Legislative Council Panel on Education, LC Paper No. CB(4)748/14-15(01). Hong Kong: Author.

[7] Education and Manpower Bureau, the Government of the Hong Kong Special Administrative Region. (2005). *Public consultation on the review of the medium of instruction for secondary schools and secondary school places allocation*. Paper presented to the Legislative Council. Hong Kong: Author.

[8] Education Bureau, the Government of the Hong Kong Special Administrative Region. (2010). *Enriching our language environment, realizing our vision: Fine-tuning of medium of instruction for secondary schools.* Hong Kong: Author.

[9] Education Bureau, the Government of the Hong Kong Special Administrative Region. (2019). *School-based medium of instruction plan for junior secondary levels (Arrangements for Secondary 1 students admitted in the 2020/21 school year)*. Circular letter to supervisors, principals of government, aided and caput secondary schools. Hong Kong: Author.

[10] Education and Manpower Bureau, the Government of the Hong Kong Special Administrative Region. (2005). *Public consultation on the review of the medium of instruction for secondary schools and secondary school places allocation*. Paper presented to the Legislative Council. Hong Kong: Author.

[11] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Mathematics education, key learning area curriculum guide (primary 1–secondary 6).* Hong Kong: Author.

[12] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Science education, key learning area curriculum guide (primary 1–secondary 6).* Hong Kong: Author.

[13] Curriculum Development Council the Government of the Hong Kong Special Administrative Region. (2002). *Science education, key learning area curriculum guide (primary 1–secondary 3).* Hong Kong: Author. Retrieved from http://www.edb.gov.hk/attachment/en/curriculum-development/kla/science-edu/sckla-e.pdf

[14] Task Force on Professional Development of Teachers, the Government of the Hong Kong Special Administrative Region. (2019). *Report.*

[15] Curriculum Development Council the Government of the Hong Kong Special Administrative Region. (2002). *Basic education curriculum guide: Building on strengths (primary 1–secondary 3).* Hong Kong: Author.

[16] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2014). *Basic education curriculum guide: To sustain, deepen and focus on learning to learn (primary 1–6).* Hong Kong: Author.

[17] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Secondary education curriculum guide, booklet 4: Assessment literacy and school assessment policy.* Hong Kong: Author.

[18] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Mathematics education, key learning area curriculum guide (primary 1–secondary 6).* Hong Kong: Author.

[19] Curriculum Development Council, the Government of the Hong Kong Special Administrative Region. (2017). *Science education, key learning area curriculum guide (primary 1–secondary 6).* Hong Kong: Author.

[20] Education Bureau, the Government of the Hong Kong Special Administrative Region. (2016). *Report on promotion of STEM education: Unleashing potential in innovation.* Hong Kong: Author.