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Chapter I
Introduction

This chapter focuses primarily on introducing the background of the "Macao Special Education Curriculum Design Project", illustrates new trends and concepts in special education, and explains the positioning and usage of the "Supplementary Curriculum Guide (Special Education)" (hereafter referred to as "Supplementary Guide").

The "Supplementary Guide", a core document to the "Macao Special Education Curriculum Design Project", aims to inform schools and teachers of the philosophy, positioning, and implementation mode of the plan to promote the Macao special education curriculum in practice.

A. Origin and rationale for the Supplementary Guide

1. The latest trend in special education

Over the past three decades, the international community has witnessed transformative changes in the concepts and practice in special education. Since the publication of the Salamanca Statement by UNESCO in 1994, inclusive education (or integrated education) has become the dominant educational model for students with disabilities around the world. The Salamanca Statement emphasizes the concept of Education for ALL and holds that students with disabilities should have access to equal educational opportunities as ordinary students. This concept is applied to curriculum domain and leads to the inclusive curriculum model (One Curriculum for All).

2. Promoting the inclusive curriculum is the trend of the times

The fundamental spirit of inclusive education is that all students should have equal right to education, one exemplification of which is to have all students study the same curriculum. Therefore, the curriculum of special education must be guided by the "inclusive" spirit---the curriculum can be considered "One Curriculum for All" only when it covers students of different abilities (including students with serious or severe intellectual disabilities.)

The General Assembly of the United Nations passed the Convention on the Rights of Persons with Disabilities (CRPD) (hereafter referred to as the Convention) in 2006 to promote and protect the rights of all persons with disabilities. The Convention states that necessary adjustments should be made under certain circumstances to ensure persons with disabilities to have equal access to and exercise of their rights. China signed the Convention in 2007 which was later passed and approved by the Standing Committee of the National People's Congress in 2008. This means that China has the obligation to implement the Convention and must take appropriate measures to this end.

The curriculum policy adopted by countries around the world to practice inclusive education share the common goal of establishing standards or goals that apply to all students' capabilities. It is important that these standard areas are all derived from the central curriculum of formal education and can also include the abilities of all students, including those with serious to severe intellectual disabilities.

3. Development and status quo of special school curriculum in Macao

The special education curriculum in Macao has relied on the research and development by schools themselves for years. In the process, though there are mutual exchanges and references among schools, the curriculum lacks unified structure, module content, and assessment criteria. Also, the curriculum prominently tends to cater to the needs of students' weaker capabilities. The reference to the formal education curriculum in special education curriculum is limited to selecting the formal education textbooks and revising part of the contents to make it the main body of the special education curriculum.

The Macao SAR government began to legalize the formal education curriculum in 2014, and has successively published the Administrative Regulation No. 15/2014, "Curriculum Framework for Formal Education of Local Education System" (hereafter referred to as "Curriculum Framework") and Administrative Regulation No. 10/2015, the "Basic Academic Attainment Requirement of Local Education System" (hereafter referred to as "The Requirements of Basic Academic Attainments"). "The Requirements of Basic Academic Attainments" for Early Childhood Education, Primary Education, Junior Secondary School Education and Senior Secondary School Education have also been implemented year by year since the academic year 2015/2016. This means that the formal education curriculum in Macao is proceeding to standardization and unification in a step-by-step manner. The legislation of formal education curriculum in Macao can be regarded as the best time for Macao to compile special education curriculum, because the purposes, subject structure, and learning units of the formal education curriculum under the principle of equal educational opportunities should be applicable to students with special educational needs. The key is that teachers need to have a set of guidelines to supplement or adapt the formal education curriculum according to the learning abilities and learning modes of students with special educational needs. Therefore, the Macao Education and Youth Affairs Bureau (hereafter referred to as the DSEJ) invited the Centre for Advancement in Inclusive and Special Education (CAISE) of The University of Hong Kong, together with special education teachers from nine public and private schools in Macao, to initiate a three-year project, the Macao Special Education Curriculum Design Project. The core tasks of the plan include:

1). Developing and drafting the Learning Ability Progress Level (hereafter referred to as the Level) for six subjects (including: Chinese, Mathematics, General Studies, Science and Humanities, Arts, and Information Technology, Sports, and Health);

2). Compiling "Supplementary Curriculum Guide (Special Education)".

The plan emphasizes that compiling the special education curriculum should base on the formal education curriculum, which is the future direction for special education development in Macao and also the purpose of this plan. This direction not only guarantees students the right to study the same curriculum, but also ensures that the educational elements of the curriculum will not be compromised due to excessive emphasis on skill training. In addition, teachers can establish a community with affiliated schools and reach consensus on the assessment criteria when formulating the same curriculum structure. The plan also emphasizes that the Level and the Supplementary Guide should be compiled with Macao special education teachers as the main contributors. The process of writing The Level and the "Supplementary Guide" gathers fruits of specialist teachers' professional knowledge and years of accumulated teaching experience in each subject to enable the final writing to possess unique Macao characteristics.

B. Objectives of the Supplementary Guide

The purpose of the "Supplementary Guide" is to provide support for teachers in planning, developing and formulating curriculum for students with special educational needs. Teachers can make references to and combine the use of the guideline from the formal education curriculum, the "Curriculum Framework" and "The Requirements of Basic Academic Attainments". In general, the "Supplementary Guide" can help schools to develop an inclusive education system (Special education curriculum system) from the following aspects:

- Review and revise existing special education directions and lay the foundation for the development of a new special education system;
- Link formal education curriculum of Macao to identify appropriate priorities for special education curriculum;
- Respond to students' diverse learning needs;
- Overcome barriers to teaching and assessment to include all students.

C. Functions of the Supplementary Guide

The functions of the Supplementary Guide are provided in the following aspects:

- Provide information to help teachers plan, prepare, develop and design courses catering to students with different learning needs according to the characteristics of each subject; at the same time, illustrate how to adjust the course content so that all students can get the opportunity to study formal education courses matching their own abilities;
- Provide a spectrum of learning ability descriptors to demonstrate the levels of learning ability and learning outcomes;
- Establish the relationship between "The Requirements of Basic Academic Attainments" and the special education curriculum;
- Provide a coordination mechanism of learning assessment, with the emphasis on the principle of comprehensive judgment;
- Provide classroom activities, stimulate students' curiosity, teach students in accordance with their aptitude, and practice the important educational principle of teaching tailored to the individual students' abilities.

D. Characteristics of the Supplementary Guide

1. Inspiring learning activities

Chapter Ⅲ of the Supplementary Guide shows relevant learning areas of various subjects and their importance to students with special educational needs. Teachers may think that some of the complicated and abstract topics in certain subjects are beyond the understanding of students with special educational needs; some examples of teaching activities are demonstrated in Chapter Ⅴ of the Supplementary Guide for teachers to adjust the teaching scenarios and goals. This ensures that even students with lower levels of ability can study the content of related subjects.

2. Adaptable to different learning needs with the formal education curriculum as its basis

Chapter Ⅳ of the Supplementary Guide, in conjunction with the "Curriculum Framework" and "The Requirements of Basic Academic Attainments", retains as many relevant contents within the learning area of each subject as possible. The curriculum objectives and learning outcomes are based on the formal education curriculum and can be adjusted according to the differences in learning.

3. Easy to identify students' abilities with the description of various levels of learning abilities in the learning areas of each subject

To enable every student with special educational needs to find their entry point in each learning area of various subjects, the spectrum of learning ability level descriptors for each subject is provided in Chapter Ⅶ of the Supplementary Guide, covering learning abilities from the lowest level (or those appear the earliest) to the highest level (or those to connect with ordinary schools), for teachers to clearly identify the levels of students' learning ability in each learning area, which is the core element of the Learning Ability Progress Level.

4. Easy to know the progress of the teaching priorities in major education levels

In order to show clearly the levels of learning ability of students with special educational needs at different age groups, the Learning Ability Progress Level is divided into four phases according to the age of students. In these four phases, students are expected to make progress not only in learning experience in line with their age and social development, but also in subject knowledge so that they can accumulate knowledge and experience in the learning process. Teachers can also avoid unnecessary repetition to improve educational efficacy.

5. Uniform terms to describe different groups of students

We use "students with special educational needs" to replace terms which have been used to describe different groups of students, such as the hearing impaired students, visually impaired students, physically impaired students, slow learners, or students with mild, moderate, or severe intellectual disabilities. We believe that each student is on the same route of learning progress, with different needs in education. We do not explicitly classify students in the psychological and medical systems, because we design students' learning objectives mainly based on their ability levels in different subject areas. For example, a student who is classified as "cerebral palsy" in the psychological and medical system may have an average level of intelligence even if he or she cannot speak or can only sit in a wheelchair, or with relatively weak motor sensory ability. Based on the concept proposed in the Learning Ability Progress Level, a student's learning ability in Physical Education may be only at level L3, while his or her learning ability in Chinese "listening" may have reached level L10.

This method of describing the levels of students' learning ability can change teachers or other stakeholders in their perception of students' learning potential. At the same time, teachers can refer to different levels of ability to set more suitable learning goals for students so as to improve their expectations to the students' learning ability.

E. How to Interpret the Supplementary Guide

The Supplementary Guide is designed to cover students with special educational needs aged between 3 to 21, including students in special education classes, special education small classes and inclusive students in regular classes. Students enrolled in various special education classes are the focus of the Supplementary Guide, since most of the students in the above mentioned classes are at notably different levels of learning ability in different subjects. In addition, teachers who teach students of different gender and ethnic, cultural, religious, and family backgrounds can all use the Supplementary Guide as a teaching reference.

In the Supplementary Guide, the term "teacher" may include homeroom teacher, teachers of various subjects, subject directors, teaching assistants, parents, therapists, counselors, social workers, psychologists, principals and all others who take care of students with

special educational needs. When using the Supplementary Guide, teachers should refer to the curriculum guides of the DSEJ and school-based curriculum materials, for planning and compiling the teaching contents, according to different levels of education, as well as the learning ability level of students with special educational needs. The Learning Ability Progress Level also provides an accurate description on students' learning performance and ability.

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Chapter II
Objectives, Curriculum Framework and Teaching Principles of Information Technology Education

This chapter is written with reference to the formal education curriculum guide for information technology (hereafter referred to as IT) in Macao. The objective is to state that under the principle of the same curriculum framework, IT curriculum for students with special educational needs originates from the formal education curriculum, and students enjoy the same learning opportunities.

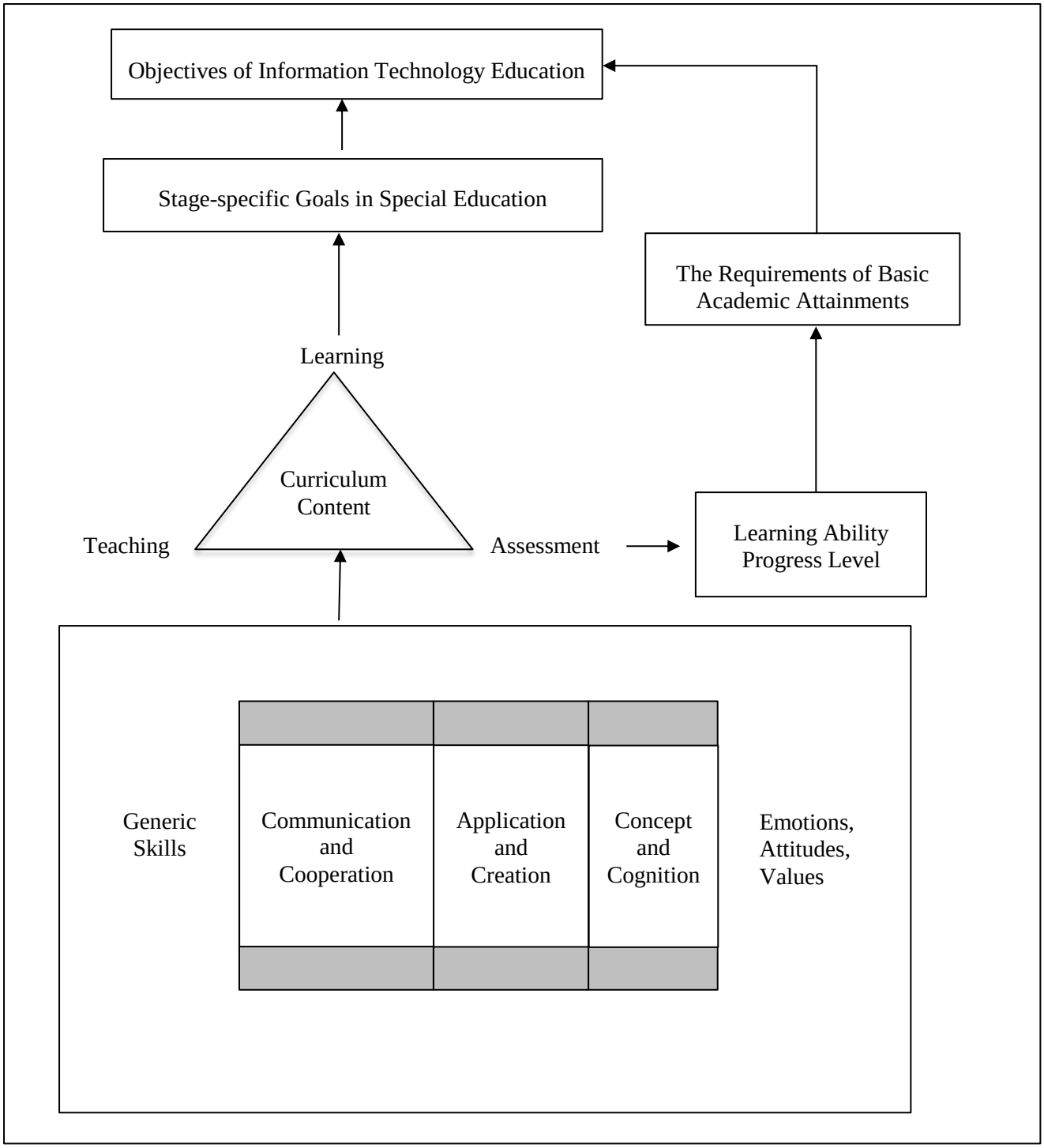
A. Objectives of Information Technology Education

Nowadays, IT exists everywhere in our daily lives: learning, work and communication. IT has become an important factor that influences human production methods, lifestyles and modes of thinking. In an information-based society, nurturing students to correctly master, apply and manage IT has become an essential knowledge and ability of modern education. Therefore, the main objectives and missions of IT education are further meeting students' learning needs in IT, developing their IT literacy and capabilities, promoting the development of their personality, potential and social skills, enhancing their lifelong learning skills, cultivating students' minds to make active use of the multi-information approach for self-learning.

B. Adjustment to the Information Technology Curriculum Framework

With reference to "The Requirements of Basic Academic Attainments" of IT curriculum (primary education and junior secondary education levels) of formal education in Macao, the IT curriculum for students with special educational needs is divided into three learning areas, namely "Concepts and Cognition", "Application and Creation" and "Communication and Cooperation", and are used as the main principles for curriculum design. The purpose of IT education is to cultivate students' learning attitude and IT application; "Ethics and Responsibilities" is also one of the important elements of IT education. The learning area of "Ethics and Responsibilities" will be integrated into the three learning areas, namely "Concept and Cognition", "Application and Creation" and "Communication and Cooperation".

Curriculum Framework of Information Technology Education（Special Education）:



C. Course Positioning of Information Technology Education

IT education focuses on guiding human beings to solve their daily problems, update and transfer this problem-solving process to solve new problems that constantly arise. Therefore, through learning activities of IT acquisition, transmission, processing, expression, sharing and management, IT education serves as an effective platform for developing students' problem-solving skills, creativity and critical thinking. Meanwhile, IT education also provides students with a balanced learning experience, including knowledge, key concepts, skills, values and attitudes which suit the students' different interests and needs, promote further studies, employment and lifelong learning. It also cultivates students' values on how to better prepare their personal growth by operating IT in an ethical, effective and secure way.

D. Teaching Principles of Information Technology Education

With the rapid development and prevalence of IT, in addition to enhancing cross-regional communication modes, IT has also facilitated interdependence of national economies and changed people's mode of communication, learning and work. Through teaching IT, teachers can cultivate students' modern citizen basic literacy by teaching students to make active use of the multi-information approach for self-learning and lifelong learning. IT in special education should let students master the knowledge of IT and foster their abilities on application. The learning process should include a series of different activities, such as classroom teaching, reading, data processing, mutual learning and life applications.

The teaching principles of IT as a discipline are as follows:

- Teach students with a gradual and orderly progress, allow students to move forward at their own pace and learn from their mistakes;
- Comprehensively study the knowledge in different areas of IT;
- Nurture students' ability in applying IT and develop their positive attitude toward lifelong learning;
- Guide students to use IT to enhance the effectiveness of learning;
- Inspire students to make good use of IT in their daily lives to integrate themselves better with the information-based society;
- Develop students' creativity and potential skills, cultivate their personalized development.

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Chapter III
Responding to Students' Learning Needs in Information Technology Education

This chapter discusses the basic characteristics of IT education and its importance to students with special educational needs and proposes to adjust the learning content and curriculum implementation to ensure that all students have the opportunity to learn in all fields.

A) Importance of Information Technology Education to Students with Special Educational Needs

IT is everywhere in our life, such as learning, work and communication. It has become an important factor that influences human production methods, lifestyles and modes of thinking. Smart cities and automated production are the major social development trends, and IT is bound to become increasingly important in contemporary social and economic development. Therefore, educating students with certain basic knowledge and skills in IT and cultivating their attitude to make good use of IT applications are the essential features of modern education.

The main objective and mission of this curriculum is to provide multiple learning opportunities to students with special educational needs, promote the development of their personality and potential, and lay the groundwork for lifelong learning. In addition, IT also brings new opportunities for students with special education needs in learning, living and employment by enhancing their life qualities, employment skills and lifelong learning abilities.

B) Learning Content of Information Technology Education

The basic learning requirements and concepts of IT education are as below:

- Attach great importance to enhancing students' information literacy and the development of scientific and technological capabilities, and promote students to integrate themselves better with the information-based society;
- Teach diversified IT learning methods to students, promote their personalized development;
- Teach students to make good use of IT in their daily lives to enhance their lifelong learning abilities and life qualities.

The main learning objectives listed below highlight the streamlined teaching content, which are used to support teachers in formulating appropriate learning objectives and providing appropriate learning opportunities for students with special educational needs, though they cannot cover all of the learning outcomes. To effectively implement the formal education curriculum, schools can adopt their own effective teaching structures or other different practices.

Learning Areas	Items
Concept and Cognition	• The types and characteristics of IT; • The main components and operating principles of a computer; • The basic equipment required for internet access and the usage of the equipment; • The basic concepts and functions of computer networks; • The characteristics of various common file types; • The characteristics of different input methods; • The correct attitude in using IT; • The health and safety practices of using computer; • Application of IT in personal life and learning; • The protection of computer and network information security; • The trends and impact of IT development.
Application and Creation	• Use the operating system to manage personal computers (PCs), such as storing, reading, retrieving data, and backing up different types of information files in PCs; • Use different input methods to input Chinese, Portuguese or English characters; • Configure, manage and use internet communication tools; • Use the hardware such as digital devices, internet and software to retrieve required information; • Operate the commonly used word processing software, such as editing a manuscript, making a spreadsheet, making presentation slides, etc.; • Use different multimedia software to design, create and display works; • Use different storage devices to store data; • Understand the operation of commonly used computer peripherals, such as: printer, scanner; • Use IT for learning and conducting research.

Communication and Cooperation	• Understand the methods and principles of information sharing; • Understand the impact of IT on the development of personal life, learning and communication; • Make good use of internet resources to learn cooperatively with others; • Express opinions through internet communication tools; • Recognise the importance of protecting personal data and respecting intellectual property rights; • Identify and refuse to browse unhealthy information; • Be responsible for one's words and behaviours on the internet.

Generic skills are the foundation of learning which help students with better learning. Generic skills include collaboration skills, communication skills, creativity, critical thinking skills, IT application, computing skills, problem-solving skills, self-management skills and research capabilities.

The learning content of IT education lays emphasis on cultivating students' abilities in applying IT in different areas, IT usage standards, problem-solving skills, thinking skills and self-learning skills. Students can develop creativity, IT application, computing skills and problem-solving skills by learning different application softwares and programming during the IT learning process. Moreover, they can also develop their collaboration, communication skills and critical thinking skills through group work exercises. Students can use IT resources to learn and develop their self-management and research capabilities.

Values can be defined as the important qualities of individuals or society, and students should be taught to build up these values, while attitudes can be defined as the personal qualities a person upholds in life. Values and attitudes influence each other. Besides deepening students' IT knowledge and skills, IT education also emphasises cultivating students' awareness of information, sense of responsibility, legal awareness and the attitude of IT application.. These values and attitudes should be taught in various learning areas and stages within the IT curriculum. For example, students can have discussions on the design of greeting cards, their special animated effects and other technical elements with others when they participate in the "E-card Production" teaching activity, and teachers can also raise students' awareness of sharing opinions with others, solving problems and taking responsibilities. Students can further understand the importance of respecting intellectual property rights when they upload and download the background music and design material from the internet, while teachers can educate students with correct values.

C) Curriculum Adjustment to Information Technology Education

The purpose of the curriculum adjustment is to enable students with special education needs to effectively acquire knowledge, take care of students' individual

differences, establish specific learning objectives, adjust teaching strategies, teaching contents and teaching environment to enhance students' learning motivations and learning effectiveness. Nevertheless, cultivating students' independent thinking, communication skills, creativity, knowledge and skills also serve as a major focus on curriculum adjustments. The following suggestions are given based on the curriculum adjustments of the three areas of IT education, namely "Concept and Cognition", "Application and Creation" and "Communication and Cooperation":

1. Concept and Cognition

Concept: Try to explain the complicated IT concepts with simple language or explain them with daily life examples, so students can better understand the meaning of these concepts.

Cognition: Minimise the interference of the external environment. Start the teaching with simple basic knowledge, and gradually supplement with detail. The way of introducing common IT products in daily life makes learning and teaching more interesting and practical, giving exercises or asking open-ended questions to students can evaluate their understanding of the course, while teachers can modify the teaching contents in a timely manner.

2. Application and Creation

Application: Before starting the exercises, teachers should adopt the step by step approach to present the complicated procedures to students, illustrate the configuration procedures and methods to students and ask students to carry out the operation. Let students increase the operation times of each procedure during actual operation and practice different application skills in a simple way. This allows students to make progress and give them a sense of accomplishment.

Creation: Creation is an extension of integrating concepts, cognition and application. Students may have some whimsical or flashy ideas, teachers should give them freedom to develop themselves and give them support no matter whether they succeed or not.

3. Communication and Cooperation

Communication: When teachers observe students' performances, they should give them guidance to seek help from others when they encounter difficulties. At the same time, teachers can give students a certain level of authority, such as playing the role of reminding or assisting others.

Cooperation: Teachers can lead students at junior levels to learn cooperatively with others; the senior group learning activities should be organised mainly by students and assisted by teachers; teachers can give guidance to students to assign tasks properly for learning.

D) Enhancing the Effectiveness of Information Technology Education
For students with different learning disabilities, teachers can refer to the following suggestions:

1. Students with hearing impairments:
    - The environment of the computer room should be free from noise nuisance;
    - Arrange students to sit closer to the teacher to observe teachers' facial expressions and physical movements easily and better understand the on-going activity that is being conducted by the teachers;
    - Teachers can learn sign language related to the IT discipline and use sign language in front of students; if students use Wireless FM System (FM), teachers can also use it with them;
    - Teachers can provide visual information to students, e.g. write the main points of the teaching contents on the blackboard, or use "computer room monitoring software" to show the contents on students' computers to allow students to have a better understanding of the teaching contents;
    - Provide multiple learning instructions to students. In addition to visual information, teachers can also use real objects, pictures and videos as means of instruction to provide different learning experiences;
    - Minimise the use of oral or dictation exams in assessments; assessments can be made on the basis of written tests, computer tests, operational tests or academic performance.

2. Students with visual impairments:
    - The environment of the computer room should be free from noise nuisance. It is also necessary to provide students with a safe and familiar learning environment, such as placing tables, chairs and computers at a fixed location to protect students' safety;
    - Teachers can learn Braille related to IT so they can understand students' homework;
    - Teachers can use the teaching material or teaching aids that cater for visually impaired people, such as teaching aids with bumpy texture, big-character posters, computers that cater for blind people, Braille books, magnifying glasses or projectors;
    - Teachers can use more audio-visual teaching materials, teaching aids or real objects for teaching, such as audiobooks, voice recorders, etc. to assist students in learning;
    - For assessment, teachers can allow students to complete their assignments with Braille, voice recorders, operational tests or oral exams, etc.

3. Student with physical disabilities:
    - Barrier-free access should be installed in the computer rooms, providing enough space for students to move their auxiliary tools, and teach students to understand the equipment and regulations of the computer rooms to reduce the possibility of injury;
    - If students are weak in their hand abilities, teachers can adjust students' operation mode or provide them with appropriate supplementary tools;
    - For assessment, teachers can allow students to complete their assignments with oral exams, voice recorders, etc.

4. Students with speech impairments:
    - Teachers should talk to students in a concise, specific and clear way;
    - Provide Augmentative and Alternative Communication (AAC) system or Picture Exchange Communication System (PECS) to allow students to express themselves;
    - Provide more opportunities for students to express themselves and communicate with others, and provide appropriate feedbacks and encouragement to students;
    - Allow students to have enough time to think about what they want to say;
    - For assessment, teachers can allow students to use shorter oral expressions or communication aid systems to answer questions. Assessments can be made on the basis of written tests, computer tests, operational tests or students' academic performance, etc .
    -

5. Students with Autistic Spectrum Disorder
    - Provide a teaching environment using the method of Treatment and Education of Autistic and Communication Handicapped Children, such as pasting the lesson's flow chart, timetable, classroom rules, and students' seating plan inside the computer room. In addition, student handbook contents should also be written in a fixed position on the blackboard;
    - Use the teaching method of Treatment and Education of Autistic and Communication Handicapped Children, assign tasks to students to keep themselves busy and provide them with sufficient guidance;
    - Provide visual teaching materials and teaching aids to students, such as: handouts, pictures, real objects, films with subtitles to assist students to understand the learning contents;
    - Simplify the information of written textbooks, such as listing points in order according to their priorities, put emphasis on the main points or use colour distinction and supplementary images to highlight the learning main points;
    - Inform students about the changes in advance such as class adjustments, vacations through verbal, visual and environmental hints, such as pictures, programme cards, timetables, which allow students to prepare themselves psychologically for the changes;
    - For assessment, teachers should reduce oral or written assessments and replace them by observation or actual operation.

6. Students with attention-deficit/hyperactivity disorder:
    - Make sure students learn in a quiet environment, avoid students sitting near windows or close to the door;
    - Teachers should use verbal and body language, tones and diverse teaching aids to guide students to focus on the learning projects;
    - Teachers should adopt the teaching method of Treatment and Education of Autistic and Communication Handicapped Children, such as pasting the lesson's flow chart, timetable inside the computer room, assign tasks to students to keep themselves busy and provide them with sufficient guidance;
    - Use task analysis method by breaking down learning into several stages to shorten the activity time (less than 20 minutes each time) and increase times for learning;

- Ask more questions to increase students' concentration;
- Use tools or assisting devices to cover the unimportant parts of the textbooks or assignments;
- Place screen-like desktop for students if necessary, or use earplugs to prevent external interference and minimise distractions for students;
- Use visual tips such as magnifying fonts, or use different fonts and colours to highlight learning objectives;
- Implement incentive programmes, assist students to complete the assignments and give them immediate feedbacks, and help students to establish good learning habits;
- For assessment, teachers can divide the assessment process into several small stages and evaluate students' abilities in every stage. In addition, teachers can remind students to pay attention to the substance of the questions.

7. Cross-disciplinary collaboration

Cross-disciplinary team members include counsellors, speech therapists, occupational therapists, and physiotherapists. A cross-disciplinary collaboration team can draw up personalised teaching plans according to students' situation and implement it in teaching. For example, in accordance with students' situation, teachers can allow occupational therapists to assist students with physical disabilities to use the keyboard or mouse. The establishment of a cross-disciplinary collaboration team can help students learn effectively and promote learning efficiency.

4

Chapter IV
Learning Ability Progress Level and Requirements of Basic Academic Attainments

Since 2015/2016 academic year, Macao has yearly and gradually implemented the "The Requirements of Basic Academic Attainments for Local Formal Education" on different levels of education. This chapter elaborates on the relation between the Learning Ability Progress Level and "The Requirements of Basic Academic Attainments", and further explains the function and application of the Learning Ability Progress Level.

A) Relationship between the Learning Ability Progress Level and the Requirements of Basic Academic Attainments

1. The Requirements of Basic Academic Attainments

The Macao Special Administrative Region promulgated "The Requirements of Basic Academic Attainments" in 2015, which has set out the basic academic attainment expectations for all levels of formal education in Macao, including early childhood education, primary education, junior secondary school and senior secondary school education. "The Requirements of Basic Academic Attainments" aim to provide specific requirements on the fundamental qualities expected for students upon completing various education levels, including basic knowledge, skills, ability, emotion, attitude and values. It also provides standards to guide and regulate teaching practice, and to assess teaching quality.

2. The Learning Ability Progress Level

In principle, the content of "The Requirements of Basic Academic Attainments" should cover all students. However, each student with special educational needs features differences in learning ability and learning progress, while "The Requirements of Basic Academic Attainments" designed and formulated based on various education levels fail to give an effective demonstration of their learning outcome. Students learn through a continuous process and make progress step by step. A progressing level design which covers the entire learning journey may better reflect the learning outcomes of students with special educational needs. Therefore, the Learning Ability Progress Level refers to a set of systematic descriptions of performance indicators, where, starting from the very basic reflective act and the motor sensory perception, several progress levels are set to describe the ability of students, and demonstrate the learning progress of students with special educational needs within each learning area, and thus give a better exemplar of the uniqueness of special education.

3. The relation between “The Requirements of Basic Academic Attainments” and the Learning Ability Progress Level

“The Requirements of Basic Academic Attainments” and the Learning Ability Progress Level are both performance indicators within the subject area. “The Requirements of Basic Academic Attainments” describe the basic ability of the whole student community upon completion of a specific education level in the formal school; while the progress level refers to a continuously developing spectrum learning processes for an individual, targeting at the learning ability of each student with special educational needs. In line with curriculum regulations, the Progress Level refers to the descriptions on learning performance from the Requirements of Basic Academic Attainments at each education level to the greatest extent, to illustrate the learning efficacy of students.

B) Structure and Connotation of the Learning Ability Progress Level

1. Structure of the Learning Ability Progress Level

The Progress Level is a system composed of different levels, where different levels of learning ability are arranged in a progressive order. The structure of the Learning Ability Progress Level can refer to the Learning Ability Progress Level chart:

- In correspondence with the ability of students with special education needs in Macao, the Learning Ability Progress Level is divided into 18 levels, which describes the features of motor sensory development of early-stage infants, and the learning ability of ordinary students in early childhood period, lower primary school period, higher primary school period and junior secondary school period.

- The levels are represented by the Letter “L”, which is taken from its English translation Learning Ability Progress Level.

- Progress level for each subject is composed of two major parts, “the sensorimotor development stage” and the “curriculum subjects’ stage”. Progress level of both parts, based on learning development, is divided into different “levels”, from the learning model of the earliest stage (L1-1 to L3-2), to levels related to each subject (L4 to L18).

- The ability level at each stage during sensorimotor development is further divided into two sublevels to enable a better mastery of the learning progress by teachers and stake holders, as the sensorimotor stage is based on the cognitive development of infants in the early stage which requires description in more details. The ability descriptions from L1 to L3 are applicable to all subjects and learning areas. Subject related examples are provided to demonstrate the specific learning scenarios and experiences

related to each subject.

- Descriptions regarding learning performance try to refer to the contents of "The Requirements of Basic Academic Attainments" at each educational level, with appropriate modifications in accordance with the characteristics of (students') learning performance of students at each level.
- The progress level is classified into several areas based on the priorities in each subject:
  - ✧ Chinese: "listening", "speaking", "reading", and "writing";
  - ✧ Mathematics: "Numbers and Algebra", "Measurement, Graphics and Space", and "Statistics and Probability";
  - ✧ Common knowledge, General Studies, Science and Hunamnies Education: "self-development", "humanistic society and life", "natural environment and life", and "science and life";
  - ✧ Physical Education and health: "sports skills", "sports and fitness", "sports and physical/mental health", and "sports and social adaptability";
  - ✧ Information technology: "communication and cooperation", "application and creation", and "concept and perception";
  - ✧ Art: "developmental skills and process", "artistic circumstances", "creativity and imagination", and "arts appreciation".

Chart of the Learning Ability Progress Level

<table>
<tr><td>Senior secondary education level</td><td>Junior secondary education level</td><td>Primary education level</td><td>Infant education level</td><td colspan="3"></td></tr>
<tr><td colspan="4">Scope of learning ability for students with special educational needs</td><td>Learning Ability Progress Level</td><td>Learning ability for ordinary students</td><td>Special education levels</td></tr>
<tr><td rowspan="3">Minority</td><td rowspan="3"></td><td rowspan="6"></td><td rowspan="15"></td><td>L18</td><td rowspan="3">Junior secondary school</td><td rowspan="3">Senior secondary level</td></tr>
<tr><td>L17</td></tr>
<tr><td>L16</td></tr>
<tr><td rowspan="3">Part of students</td><td rowspan="3">Minority</td><td>L15</td><td rowspan="3">Higher primary school</td><td rowspan="3">Junior secondary level</td></tr>
<tr><td>L14</td></tr>
<tr><td>L13</td></tr>
<tr><td rowspan="6">Majority</td><td rowspan="3">Part of students</td><td rowspan="3">Minority</td><td>L12</td><td rowspan="3">Lower primary school</td><td rowspan="6">Primary level</td></tr>
<tr><td>L11</td></tr>
<tr><td>L10</td></tr>
<tr><td rowspan="6">Majority</td><td rowspan="3">Part of students</td><td>L9</td><td rowspan="8">Early childhood period</td></tr>
<tr><td>L8</td></tr>
<tr><td>L7</td></tr>
<tr><td rowspan="6">Majority</td><td>Minority</td><td>L6</td></tr>
<tr><td>L5</td></tr>
<tr><td rowspan="2">Part of students</td><td rowspan="2">L4</td></tr>
<tr><td rowspan="6">Infant level</td></tr>
<tr><td rowspan="6">All</td><td rowspan="4">All</td><td>Majority</td><td>L3-2
L3-1</td><td rowspan="6">Motor sensory development stage</td></tr>
<tr><td rowspan="3">All</td><td rowspan="3">All</td><td>L2-2
L2-1</td></tr>
<tr><td>L1-2
L1-1</td></tr>
</table>

2. Connotation of the Learning Ability Progress Level

- The scope of learning ability for students with special educational needs at each education level is assessed and evaluated based on the experience and observations of professional special-education teachers. In line with their growth and development, students with special educational needs are expected to reach L6 level to the utmost in the early childhood education stage, while students with special educational needs in senior secondary school stage rarely exceed L18. It should be pointed out that students with special educational needs do have the potential to demonstrate learning ability exceeding the estimated scope at certain education levels. For example, a student with special educational need in the early childhood stage may exceed the L6 level, and a student with special educational needs in the senior secondary school stage may outperform L18 level. In these scenarios, the same curriculum structure should apply to the students to extend his/her learning level to L7 or the level of the formal senior secondary school education.

- The Learning Ability Progress Level describes the abilities of students demonstrated in the learning experience, arranged in a progressive learning process. The Learning Ability Progress Level only represents the significant indicators at each educational level for each subject, which shall not be considered as representations of the overall learning content, nor the specific curriculum. Therefore, descriptions of the Learning Ability Progress Level should not be considered as equal to the curriculum content or learning objectives.

C) Learning Development Stages

1. Sensorimotor Development Stage

Human development in (at) the infant stage is mostly reflected by the sensorimotor development. Motor sensory training plays an important role in fundamental education. All learning acts and cognitive behaviors of students start with information collection and analysis by effectively utilizing the motor sensory ability, followed by systematic processing of the information. The process of information selection highlights a sound rapport among the acute sensory motors and accurate sensory coordination, motors and technics. Therefore, whether students can receive and analyze information, extract and store knowledge in memory, and utilize knowledge in the proper time and condition is subject to his/her acute sensory ability, appropriate selection and react, and long term memory.

All children go through the sensorimotor development stage. Most children pick up these skills in a natural manner in daily life without taking specific courses; however, students with special educational needs are restricted to various extent by a slower development in intelligence and learning progress, therefore students with special educational needs require special training and study to master relative skills.

Uzgiris & Hunt (1975) proposed the six scales of sensorimotor and cognitive foundations in early developmental stage, including:

- The development of visual pursuit and the permanence of objects
- The development of means for obtaining desired environmental events
- The development of vocal imitation and gestural imitation
- The development of operational causality
- The construction of object relations in space
- The development of schemes for relating to objects

The above mentioned six scales, universally applicable to all learning fields, constitute the foundation for cognitive development for infants. In other words, these abilities are the foundations for all subjects; students with special educational needs, especially students with severe learning disorder, develop quite slowly in the early stage. Therefore, these students may not be able to surpass L3-2 level within the complete special education learning stages. Under such circumstances, a broad and balanced curriculum system within their capability is of great significance as it enables the opportunity to get access to rich learning experience.

2. Early childhood stage

The early childhood stage, as the starting point of formal education, is recognized as an important stage to lay the foundation for lifelong learning and whole person development. The early childhood growth and development is a continuous spectrum with established sequences. Generally speaking, children reaching a certain age or developmental stage demonstrate corresponding changes in their physical ability, cognition, language, behavior and social interaction patterns. These developments are subject to predetermined genetic factors as well as to acquired experiences and educational environment.

Though students with special educational needs fail to develop at the speed of ordinary children, their developmental process demonstrate(s) the same patterns. For example, a student learns to walk before mastering running, and learns to speak

individual words before speaking full sentences. Thus, the purpose of establishing the Learning Ability Progress Level is to provide a stage-based reference for teachers and stake holders, so that the teachers can develop a better idea of the status quo of students and learning targets (direction). In compilation of descriptions on the level L4 to L9, special reference is taken from the materials regarding characteristics of early childhood development to include the developmental milestones in the description.

3. The stage of cognition and skill development

While students grow, they continue to make progress in physical ability, knowledge and skills on the basis of early childhood development. In accordance with the cognitive development theory proposed by Piaget, students reaching the mental age of six have entered the period of concrete operations. In this period, students are able to solve issues based on concrete experience and logical thinking, utilize specific objects to assist thinking, and better understand the principle of reversibility and conservation. They are fairly good at the use of inductive logic, and handling issues involving complicated and abstract standards.

As mentioned above, students with special educational needs are not different from ordinary children regarding the cognitive development process. If the mental age of students with special educational needs can reach the period of concrete operation, it is possible for them to learn more complicated and abstract content. However, due to the diverse and complicated patterns of students with special educational needs, their developmental process may not be the same as ordinary children. For example, they may not complete learning contents within one year that ordinary children are able to complete within one year. Therefore, the descriptions on ability and performance based on different levels enable teachers and stake holders to recognize the cognitive ability of students with special educational needs and their developmental curves. Starting from L10, each level is approximately equal to the learning content of the average child within one academic year.

4. The stage of higher-order thinking development

The recent decades witness a widely supported proposal on reforming the curriculum and teaching paradigms in the international community, which strongly calls for equipping students with higher-order thinking to cope with the ever-changing world. Yeung (2012) elaborated on the connotations of higher-order thinking, including four dimensions as below:

- Traditional thinking strategies
- Core thinking skills
- Integrated thinking models
- Thinking dispositions

Some students with special educational needs, especially those with severe learning disorders, may not be able to reach the stage of higher-order thinking regarding cognitive development, but this shall not rule out the possibility that they can cultivate(obtain) higher-order thinking upon abundant learning experience. Therefore, providing a broad range of balanced courses for students with special educational needs can help them to broaden their experience and enhance their abilities, which is also the duty of teachers.

D) Application of the Learning Ability Progress Level in Learning and Teaching

1. The Learning Ability Progress Level has the following advantages:
The Learning Ability Progress Level provides a systematic and clear description concerning the learning performance of students at each level, enabling the school, teachers, parents and other stake holders to better understand the learning ability of students and communicate with among stake holders;

- The Learning Ability Progress Level provides details on the assessment of learning progress, a framework for teachers to refer to in the process of identifying and reporting learning outcomes. The Learning Ability Progress Level can also provide assistance to formulation and modification of future learning objectives and plans to promote the learning outcome;
- Teachers need to collect massive data on the learning performance as evidence of learning outcome; Teachers should carefully observe the learning performance of students, enhance knowledge of students, which is conducive to adjust the teaching strategy;
- In collection of performance evidence, teachers should discuss on "evaluation coordination" to reach common consensus on student evaluation, which is conducive to enhancing teacher's understanding of the Level principles and their professional development.

2. Applying the Learning Ability Progress Level to promote learning

It is commonly believed that the subject area of formal education curriculum is too challenging, abstract and out of reach for students with special educational needs. The reason for this widely held perception lies in the current practice of prescribing levels of ability for each subject unit, which requires students to reach certain learning level at specific learning stages. For example, only students reaching primary school level are allowed to learn Tang poetry. As a matter of fact, the learning content should be considered as the vehicle of learning, while the core of learning should be put on the

objective and the individual growth of students in each subject area, including knowledge, skills and attitude; Therefore, the method of establishing curriculum based on the framework and foundation of formal education in accordance with the ability level of students, can ensure that all students make balanced and extensive development. The level-based special education featuring high efficacy is also the foundation of inclusive education which can improve the students' ability via the learning content.

The textbook in each subject is the learning vehicle. The guiding principle for curriculum design is to broaden students' life experience, enable them access to objects at different levels and develop knowledge together with individual experience and understanding. Students with severe learning disorders, due to genetic limitation, may not exceed the motor sensory development stage even with years of learning. However, learning that connects multiple subjects provides students with an extensive perspective, which is also the principle of depth and scope in curriculum design.

Students with special educational needs should adopt the same teaching topics and modules as those of the ordinary students to ensure the scope and balance of curriculum, though teachers with professional experience can exercise discretion to adjust the contents based on the learning ability of the students. This practice may properly address the lack of properteaching textbooks for classes or students with special educational needs. When the teachers get hold of the learning progress of students, they should adjust the learning contents on the basis of regular curriculum, and design learning experience attending to the students with special educational needs. Schools should hold "learning units" for each level, each subject and each area, to satisfy the learning requirements of students at each educational stage, so that they won't be exposed to the same teaching units repeatedly.

3. Applying the Learning Ability Progress Level to assess learning efficacy

To enable students with special educational needs to learn under the curriculum framework of formal education, the key lies in designing a set of progress level that includes the fundamental abilities within the scope of each subject. We believe that all students, irrespective of their ability level, have the ability to learn, though to different degrees of development and progress. Therefore, the Level start(s) from the motor sensory development stage of infants; each student (including a student with severe learning disorder), in principle, could demonstrate their learning ability within the scope of each subject. In this way, teachers can set goals, design activities and set out expected outcomes in each subject area in line with the learning content. The learning experience of students is based on his/her performance within individual ability, thus

the teachers may effectively cater to the differences among students based on their learning ability.

The Learning Ability Progress Level is also a tool to assess learning progress, and should not be used as part of the teaching content. Students with special educational needs may not make learning progress as expected, with fluctuations from time to time, thus the Learning Ability Progress Level shall not be applied to daily progress assessment, but rather the learning outcome of students upon a period of study.

Data on the Learning Ability Progress Level of each school should be collected and uploaded to the data processing platform., where the system, with a certain amount of data accumulated, can conduct data analysis for the purpose of teaching feedback and improving teaching efficacy, including analysis on the cross-school, cross-subject, cross-area and cross-year performance report, as well as the annual progress for certain students.

4. Applying the levels to promote professional development

The Learning Ability Progress Level provides teachers with a set of language to describe the learning performance of students. It not only can strengthen professional communications among teachers working in the same and different schools, but also help to establish the special education culture within a school. The set of language can also play a role in home-schooling practice, enabling parents to better understand the students and their learning performance.

When applying the Learning Ability Progress Level to identify the level of students' learning ability, teachers should collect examples of students' learning performance, which may include photos, videos and audios. Teachers should organize an "assessment coordination" meeting to discuss the learning level of the student concerned. These processes help teachers to have a more thorough understanding of the status of the student and design more relevant learning activities.

When teachers describe or interpret the Learning Ability Progress Level, they can experience the multiple feasibility of special education, and understand the concept of the same curriculum framework; within the appropriate curriculum framework, it is possible and necessary to provide formal education opportunities to all students (including students with special educational needs). Schools should develop common consensus on this perspective, which may help to consolidate the professional foundation for special education, and improve professional development of teachers in special education schools.

5. The Learning Ability Progress Level is not designed for the following purposes:

× to demonstrate the learning ability of students on a daily basis;

× to conduct progress assessment on a daily basis;

× to specify the learning content or to be used as a concrete development curriculum list;

× to assume the same levels for students in each learning area or teaching unit;

× to assume that the performance of students at a specific subject topic equals their annual progress, and form individual learning objectives on such basis;

× to be the label to describe students;

× to identify and recognize students with special educational needs.

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Chapter V
Opportunities and Activities

This chapter focuses on illustrating the learning opportunities and teaching activities feasible for students with various learning needs and in different educational stages, within the realm of IT education.

IT education is a content-based discipline; it is everywhere in human life, such as learning, work and communication, and is increasingly becoming an important factor that influences human production methods, lifestyles and modes of thinking. Therefore, when teachers select teaching units, they should ensure that students are able to understand the purposes of applying knowledge, skills and experience, as well as integrating IT into their lives, making use of the resources to create and construct new concepts. These are the unique elements of IT education.

This chapter provides examples of teaching activities in four educational levels respectively. Each example takes into account the age, maturity and ability level of students, and lists the expected learning outcomes of students with different ability levels. The scheme of work demonstrates that students with different learning abilities can have different performances in different learning areas. In order to show the differences of students' abilities more concisely, only three levels with significant differences in each educational level are selected for illustration, and the actual teaching should be adjusted according to the students' actual abilities. The following examples provide practical suggestions for teaching contents and activities and serve as models for future schemes of work. Please refer to Appendix IV.2 for the table.

A) Example of Teaching Activity in Early Childhood Education

Field of Study:	Information Technology	Learning Areas:	Concept and Cognition, Application and Creation	Stage:	Infant Education
Duration of Learning:	8 lessons				

Unit Name:	Introduction to computer
Formal Teaching Goal:	Know the basic equipment and the use of a computer
Teaching Objectives:	Through this unit, students can: 1. Have basic understanding of different types of computers (e.g. tablets, laptops and desktops) 2. Able to tell or select the basic components of a computer 3. Know the basic operation of a keyboard 4. Able to use a keyboard to input characters 5. Know the basic operation of a mouse 6. Able to use a mouse to move the cursor correctly
Keywords:	Host computer, screen, keyboard, mouse

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
Have a basic understanding of different types of computers, and be able to tell or select the basic components of a computer	Students can observe and explore different types of computers, electronic products, computer peripherals, electric toys, etc.: • Students listen to teachers' explanations of various components of a computer, such as: monitor (the result will be displayed on the monitor after data processing process), host computer (the central unit handling all the computing operations and it is the core of a computer), mouse and keyboard (user can use them to send data and instructions to the computer). • Students are able to find the item or respond to questions.	L2-1	• Be able to examine several computer items in the front of their eyes • Be able to explore different parts of a computer (e.g. keyboard) by tapping them repeatedly • When the video stops, students are able to tap the screen to show that they want to continue watching it
Know the basic operation of a keyboard, and be able to use a keyboard to input characters	Know the basic operation of a keyboard: • After students learn about the basic equipment of a computer, teachers can first demonstrate the operation of a keyboard and then students can try to use the keyboards to input simple characters; • Students can pick a card with numeric values and enter the number accordingly; • Students can pick a card with a letter and enter the letter accordingly;	L3-2	• Students are able to find out the covered computer items, such as a mouse • Students are able to imitate the way teachers press the keyboard • Students are able to imitate the way teachers use the mouse

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
Know the basic operation of a mouse, and be able to use it to move the cursor correctly	Know the basic operation of a mouse: • Teachers demonstrate the movement and operation of a mouse, and then students can try to move their mouse; • Students can try to play the "Hamster" game with their mouse, move the cursor and click the mouse to hit the hamster (click the mouse correctly; scores will be given after they finish the game).	L5	Know the basic operation of a mouse, and be able to use it to move the cursor correctly

B) Example of Teaching Activity in Primary Education

Field of Study:	Information Technology	Learning Areas:	Concept and Cognition, Application and Creation	Stage:	Primary Schools
Duration of Learning:	8 lessons				

Unit Name:	Introduction to Microsoft Paint
Formal Teaching Goal:	Know the basic functions and characteristics of Microsoft Paint
Teaching Objectives:	Through this unit, students can: 1. Know the basic functions of Microsoft Paint 2. Know the characteristics of computer graphics 3. Create drawings with Microsoft Paint 4. Save files correctly 5. Share their creative works
Keywords:	Microsoft Paint, functions, characteristics, save files

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
Know the basic functions of Microsoft Paint and the characteristics of computer graphics, and create drawings with Microsoft Paint	Students observe a work created by Microsoft Paint (the work should present a view of many red apples on an apple tree, a house that is made up of straight lines, the grass with little flowers in different colours, or a work that contains similar elements): • Students can point out the characteristics of the work: such as the work contains many colours, straight lines, the apples on the tree are the same, etc. • Teachers explain the basic functions of Microsoft Paint. Students can select the "Brushes" button to draw or fill objects with colours.	L3-2	• Students can use touch screen computers, click the "Brushes" and "Colour" buttons and select different types of pens and colours to draw or fill objects. • Students are able to appreciate others' works and listen to their classmates' sharing.

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
	● Students can select the "Colour" button to choose different colours to draw or fill objects ● Students can select the "2D Shapes" and "3D Shapes" buttons to draw different 2D and 3D graphics ● Students can select the "Select" button to select the shape ● Students are able to copy and paste a shapeStudents can select the "Text" button to type the "2D text" and "3D text"	L5	● Students are able to draw different 2D and 3D graphics, and are able to copy and paste the graphics for creative painting ● Students are able to introduce their works to classmates
Save files correctly and share their creative works	• Students can name files according to teachers' requirements and save them to specified folders. • Students are able to share their works with others and are able to make simple comments on other people's works	L9	• Students are able to input "2D text" and "3D text", name files according to teachers' requirements, and save them to specified folders • Students are able to comment and give feedback on their classmates' works

C) Example of Teaching Activity in Junior Secondary Education

Field of Study:	Information Technology	Learning Areas:	Concept and Cognition	Stage:	Junior Secondary Schools
Duration of Learning:	6 lessons				

Unit Name:	The characteristics of information
Formal Teaching Goal:	Know the meaning and characteristics of information
Teaching Objectives:	Through this unit, students can: 1. Tell the meaning of information 2. Understand how information brings convenience to our lives 3. List the common types of information 4. Understand the main features of information 5. Know the authenticity of information
Keywords:	Information technology, data, information, verification

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
Tell the meaning of information, understand how information brings convenience to our lives	Teachers and students can discuss what information is. For example: When the bell on campus is ringing, what kind of information is being told? What kind of information can we acquire when we look at the school calendar? Students can search for some short videos of "Information Technology" (For example: "A Good Day, Future Technology" https://www.youtube.com/watch?v=shTUDpXI0YY) Teachers and students can have discussions together: • What do you think is information in the short video? • What do you think is information in our daily lives?	L5	• Be able to say that information is everywhere in our daily lives and it brings convenience to our life. • Give correct responses to all kinds of information in our daily lives (For example, when you hear the class bell rings, you understand that you have to go toclass and return to the classroom).
List the common types of information and understand the main features of the information	Students can have discussions on the issues raised by teachers (the characteristics of information), for example: • What information does the broadcast on the bus tell us about? • What are the characteristics of the weather forecast information provided by The Macao Meteorological and Geophysical Bureau? Teachers can draw conclusions based on students' responses and point out the timeliness and shared characteristics of the above information.	L9	• Be able to tell the common types and main features of information
Know the authenticity of information	Students can have discussions on the issues raised by teachers (the authenticity of information), for example: • Are online forum messages reliable? • Are online medical folk prescriptions reliable? Teachers can draw conclusions based on students' responses and point out that we cannot fully trust the authenticity of online information. We should verify them and we should not easily relay erroneous messages.	L12	• Students are actively engaged in discussion activities and are able to actively verify the authenticity of information

D) Example of Teaching Activity in Senior Secondary Education

Field of Study:	Information Technology	Learning Areas:	Concept and Cognition	Stage:	Junior Secondary Schools
Duration of Learning:	6 lessons				

Unit Name:	Data calculation and analysis - data sorting, filtering and statistics
Formal Teaching Goal:	Be able to collect data, summarize information and analyse it;
Teaching Objectives:	Through this unit, students can: 1. Perform data collection and collation 2. Input formulas into spreadsheets 3. Set up the sorting function to complete the sorting of single or multiple keywords 4. Use the sorting result to briefly explain the problems 5. Create charts based on the problems and analyse the problems
Keywords:	Sorting, filtering, statistics

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	
Perform data collection and collation and input formulas to spreadsheets	Students can use Google Form to create a personal data questionnaire to collect information on their height, weight, gender, etc. for data calculation and analysis: • Invite classmates to fill out the questionnaires and use the data to create spreadsheets; • Enter the BMI calculation formula to calculate BMI values for everyone	L9	• Students are able to collect useful information • Students are able to input formulas into spreadsheets, and are able to correctly input BMI calculation formula to spreadsheets
Set up the sorting function to complete the sorting of single or multiple keywords, and use the sorting result to briefly explain the problems	• Perform simple data sorting and filtering (For example: find out the tallest/shortest classmate in the class, find out all the students who are too skinny/overweight, etc.); • Enter the formula to calculate the BMI values for the male and female students and keep statistics on the proportion of students who are too skinny, normal and overweight.	L12	• Students are able to set up the sorting function, input the formula correctly, use the sorting result to find out students who are too skinny, normal and overweight.
Create charts based on the problems and analyse the problems	• Use the BMI numerical ratios of male and female students to create charts respectively; • Compare different charts and summarize what BMI values that are presented by the chart are more appropriate, analyse the data and give suggestions to students.	L15	• Students are able to create and analyse charts to provide health advice to classmates

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Chapter VI
Assessment and Rating Coordination Mechanism

This chapter explicates the methods to apply the Learning Ability Progress Level to student's assessment, putting the emphasis on professional consultation. In daily teaching practice, teachers are encouraged to observe the learning performance of students, collect examples and identify the learning outcome. It is suggested to read this chapter together with Section 4 in Chapter IV on the application of the Learning Ability Progress Level in teaching and learning.

A. Need for Rating Coordination

It is inadequate and unreliable to judge the students' ability level based on the observation of one single learning event. Examples for student assessment should be accumulated from multiple learning scenarios over months. Teachers, based on the examples collected from different learning opportunities and scenarios, can make professional decisions concerning the students' ability to proceed to learning in a new level.

Teachers should adopt the principle of "comprehensive judgment", based on the data and results of school assessment, to determine the appropriate level when judging the level of students' ability. However, different opinions may arise among teachers on the performance for some students. In order to reach valid and consistent judgment, it is necessary to develop a rating coordination mechanism within the same school or among schools.

"Comprehensive judgement", as is indicated by the name, refers to the practice of determining the ability level of students through multiple examples. It is not compulsory for students to obtain the learning outcomes fitting all the descriptions for the level concerned, yet they do need to fit a majority of the descriptions to be qualified for the level considered. To be more specific, among the 6 described items in the specific level, the student should fit 4 or 5 items and demonstrate potential in the remaining items for which he/she may temporarily fail to meet the standard due to environmental factors or physical disability. In other words, more rigorous standards should be adopted to determine student performance.

The "rating coordination" mechanism, which enables teachers and stake holders to review, revise and determine the descriptions concerning rating judgments of students' ability, is initiated to help schools to achieve reliability and consistency in student performance assessment. A solid assessment procedure can thus be established via regular "adjustment" practice. An effective adjustment cycle starts from a team of teachers launching the assessment project, followed by the whole school participation which helps to enhance the skills and confidence on assessment validity, and finally develops into a robust assessment procedure with cross-school identification.

Conducting "rating coordination" among teachers within one school can generate the following effects:

- To have focus group meetings to discuss student ability;
- To familiarize teachers with the application of the Learning Ability Progress Level;
- To consolidate the teachers' understanding on descriptions of levels;
- To promote teachers' understanding of the assessment and promote their professionalism;
- To enable dialogues among teachers, staff and professionals for the purpose of reaching proper judgment based on personal observation and experience.

Schools can also improve the quality of "rating coordination" via discussions with students and their family. The teachers should realize that:

- discussion with students on their homework and sharing with student their progress contributes to student's perception of their own study and ability;
- discussion on student progress with people who interact with the students at various environments is beneficial to decide the most appropriate "ability and performance" of students;
- Informal discussions among teachers could offer important insights into the student development in other areas, which is conducive to enhance all the teaching staff's recognition and perception of the students' ability.

B. Practice of Rating Coordination

The rating coordination mechanism is a simple process designed to ensure the reliability and adequacy of the assessment approaches teachers adopt. Participants in rating coordination can be teachers and other professionals within the same school, or teachers from other schools. Teachers firstly conduct preliminary rating for an individual student in accordance with the levels on the basis of the collected examples for students' performance. Teachers should share their assessment decision and supporting examples on the rating coordination meeting, and discuss with colleagues to reach consensus on the reliability of the judgment. In this process, teachers will discuss the examples of performance for students of similar levels on the same subject to reach judgment consistency. The rating result should be recorded in the table provided in Appendix 4.1.

The rating coordination mechanism is based on professional dialogue. Teachers can adjust their judgment and reach consensus in the rating coordination process, to reach an agreement on the reliable examples that can powerfully support the level of ability students have achieved. The rating coordination mechanism aims to ensure the effectiveness and consistency of the teacher's judgement, and to promote teachers' professional development. Subject directors as well as other professionals also play an important role in the process of rating coordination.

A school should conduct rating coordination activity within the school each academic year, to ensure a unified judgement of teachers on the understanding and learning outcomes of the assessment principles; the following approaches are suggested for rating coordination activity:

- Teachers collect examples regarding the learning performance of students via various learning opportunities and scenarios.
- Teachers apply the principle of "comprehensive judgment" to decide the levels of students' ability based on the collected examples and other materials.
- The school should hold rating coordination meeting to discuss the students' learning ability and reach consensus.

- Teachers discuss the learning ability of other students based on the principle and examples in the first discussion.
- It may be necessary to revise the results achieved in the first discussion to keep the consistency of judgment.
- The school should design a specific system to appropriately save the records of performance examples for each individual student and upload the rating level into the level database for further analysis.
- The assessment based on the levels and rating coordination meetings is suggested to be conducted once each academic year.

  After the rating coordination meeting, teachers can save the examples supporting the level judgements as part of the school assessment framework, and discussion materials for joint activities among schools (if applicable) concerning the rating coordination mechanisms.

C. Notes on Example Collection

It is very important for teachers to collect multiple learning examples to support the judgment. Examples and evidence can be from various sources in diversified forms, including:

- Pictures and video clips
- Observation records
- Class quiz
- Anecdotes
- Reports
- Self-evaluation of students
- Peer review
- Students' works
- Other forms of works and practices

Teachers can keep records based on their own observation, or the observation reported by other people, to assist and support judgment on students reaching a certain level of learning ability. The providers may include:

- Other teachers
- Teaching assistants
- School staff
- Speech therapist
- Physiotherapist
- Occupational therapist
- Social worker
- Parents
- Siblings
- Classmates
- Peers, etc.

Learning environment has a significant impact on students' behavior. Factors in the learning environment, such as lack of experience, limited opportunities, overly low or high expectations, and inappropriate teaching practice, may become obstacles to learning and hinder the students from understanding their potential. When students get along with strangers in an unfamiliar environment or a formal learning environment, they will feel great pressure, and thus fail to learn or demonstrate their ability in an effective manner. In other words, students, in familiar surroundings and accompanied by trusted teachers, can reliably repeat some reactions.

However, students should be able to transfer what they have learned to new scenarios or generalize for similar situations.

Teachers can observe the performance and reaction of students outside the classrooms, to develop a more thorough understanding of the students' ability to apply the learned knowledge to the new scenario. In addition, it is also crucial to record the response of students at home, in the community, different classrooms and other learning opportunities and activities. Scenarios outside the classroom can provide a good opportunity to judge the performance and ability of students in applying the communication skills, literacy, social interaction and computation.

No matter what kind of examples teacher collect, they should provide background information for record and supporting judgement. Relevant background information includes:

- Date and time of the performance recorded;
- The scenario. For example: in class, in the community, or at home;
- The people with the students, such as therapist, teaching assistant or peers;
- Related resources used, such as the computer or teaching equipment;
- Whether the response is "new" (first time), "manifesting" (new but unstable response), or "established" (expected response of students under certain occasions and conditions);
- Degree of guidance, support or prompts offered to the students in making the responses, such as demonstration, imitation or verbal prompts;
- Usage of communication assisting tools (reasonable assistance);
- Whether the teacher has made adjustments or revisions to demonstrate the learning process, such as the learning outcomes to be replaced, or specific examples recorded.

Most importantly, teacher can develop a clear understanding of the current ability of students and their expected learning progress in the process of collecting examples. The examples of learning performance include:

- Examples of what students "are capable of";
- Evidence collected over a long period from different learning situations;
- Works of students completed without assistance (the degree of assistance also need to be recorded. The gradually declining assistance is also a recognition of progress.);
- Learning outcomes that fit the level, but not included in the descriptions;
- Reasonable usage of assisting tools to help students achieve learning outcome;
- Exemption of learning performance due to special needs of students;
- Non-monolithic learning event;
- Learning outcomes beyond the descriptions;
- Example of students' interest in looking for not yet mastered content.

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Chapter VII
Attainment Level Descriptors of Learning Ability Progress Levels in Information Technology Education

This Chapter is composed by "Seed Teachers" with reference to curriculum guides, "The Requirements of Basic Academic Attainments", and textbooks in conjunction with their teaching experience. The levels are divided into two parts: motor sensory development stage and disciplinary development stage, covering learning performances from early childhood education to senior secondary education. The motor sensory development stage applies to all learning areas, and the disciplinary development stage has four learning areas: including "Concept and Cognition", "Application and Creation", and "Communication and Cooperation".

(A) Motor Sensory Development Stage (applicable in all learning areas):

L1-1：Students start to engage in activities and undergo experiences.

- Trace slow-moving objects by sight with uncertainty, for example: students can keep track of the slowly moving mouse in front of them with uncertainty.
- Attempt to connect with objects by sight. For example, students can turn their heads around to look at the discs being held in their teachers' hands.
- Students can make sounds apart from crying or laughing when they are emotionally stable, for example, grunting.
- Express interests in familiar simple gestures but will not try to imitate the gestures. For example, when teachers are waving their hands to say goodbye, students will look at teachers' hand movements, but will not try to imitate the hand gestures.
- Start to show slightly conscious action, for example, when the phone rings, students will respond to the phone ringing tones around them with physical movement signals.
- Try to observe objects, for example, students will try to turn their heads around to look at a toy car making noise.
- Able to perform reflexive reactions, for example, the student blinks his/her eyes when the teacher moves a tablet towards his/her eyes.

L1-2: Students gradually become aware of the activity and learn from it.

- Notice the disappearance of a slow-moving object. For example, students can keep track of the mouse moving slowly in front of their eyes until it disappears, and students' eyes will move to the direction in which the mouse disappears.
- Pay attention to certain people, events, objects, or parts of an object and try to touch those objects. For example, teachers can show the sound-making toys to students within their sights and place them within the area where they can easily reach so that students can try to touch them with their hands.
- Respond to the similar sounds that are made by babies and try to imitate them but in an unsuccessful way. For example, when teachers say the letter "i", students will pronounce the letter with a sound that is not similar to this.

- Express interests in familiar simple gestures and try to imitate them. For example, when teachers are waving their hands to say goodbye, students can try to imitate it but it does not look the same.
- Be able to repeat hip (or body) movements to maintain the movement of an object. For example, students can keep pressing the sound button of a toy to keep the sound on.
- Be able to find out the object through its sound and focus on the source of the sound. For example, teachers can stand behind students and randomly place the speaker to the students' left, right or above them. Students can pay attention to the source.
- Start exploring things with their mouths. For example, students start putting the remote control into their mouths and suck it.

L2-1：Students start to have a relatively consistent reaction to the people, incidents and objects that they are familiar with.

- Able to find an object that is completely hidden. For example, when teachers cover a mouse with a cloth within their sights, students will be able to pull away the cloth and retrieve the mouse.
- Able to shake hands systematically and repeatedly to create an interesting experience. For example, students can tap the keyboards to make sounds and express a sense of excitement.
- Able to imitate similar sounds. For example, when students hear "i", they can imitate the pronunciation with a similar sound "i".
- Imitate familiar movements instantly. For example, when teachers perform some of the familiar movements such as moving the mouse, students can imitate it immediately.
- When a continuous action suddenly stops, students can react with a direct action to indicate a "request". For example, when teachers use electronic media to play nursery rhymes and when it suddenly stops playing, students can tap the desktop to indicate that they want to continue listening.
- Able to trace fast-moving objects with their eyes. For example, when a mouse falls to the ground within their sight, students will fix their gaze on it.
- Able to glance through several objects at the same time and attempt to trigger feedback or interactions. For example, teachers can place different electronic products in front of students, and students will pay attention to the items of their interests.

L2-2：Students start to have proactive performances in interactive activities.

- Able to find an object that is completely hidden from one out of three different locations. For example, teachers can show three upside-down boxes within students' sight and place a 3D printed toy inside one of the boxes, students are able to open the box with the toy and take it out.
- Take action actively in interactive activities. For example, when teachers push the toy car behind students, students will turn around to search for the toy car.
- Able to imitate the pronunciation of familiar vocabulary items with one syllable. For example, when teachers say "pad" to students, students can imitate and pronounce "pad".
- Attempt to imitate unfamiliar gestures. For example, when teachers first demonstrate the way of pressing a mouse, students will intend to imitate.

- When a continuous action suddenly stops, students can react with an obvious

action to indicate a "request". For example, when teachers use electronic media to play nursery rhymes and when it suddenly stops playing, students can indicate that they want to continue listening by clapping their hands or by saying the word similar to "want".

- Able to explore different objects with an experimental approach and have short-term memory of the result. For example, students can put the toy inside a box, open the cover of the box and take out the toy.
- Able to express their emotions in their own way consistently. For example, when a favorite toy car is being taken away, students will express their dissatisfactions in a consistent way.

L3-1：Students start to communicate with people consciously.

- Able to keep their attention in a short period of time and find a specific object under three layers of things. For example, teachers can show three upside down boxes within the students' sights and place a 3D printed toy inside one of the boxes. Then, teachers can slowly and randomly move the three boxes and students will try to find the box with the 3D printed toy, even though they might not succeed.
- Able to memorise the things they have learned and use the knowledge to retrieve things. For example, teachers can put a 3D printed ball inside a sack, then students can use their experience to pull the sack close to themselves and take out the 3D printed ball.
- Able to imitate unfamiliar sounds without high accuracy. For example, when teachers say "phone" (mobile phone) to students, they are able to imitate and say "phone", but not with a similar pronunciation.
- Able to imitate unfamiliar actions without high accuracy. For example, when teachers demonstrate how to use fingers to press the number keys on a keyboard, students are able to imitate this action.
- Before an action begins, students can consistently make actions or expressions to start things or activities of their interests. For example, when teachers are ready to turn on the electronic media, students can raise their heads or make some sound similar to "turn on".
- Able to explore an object in a more sophisticated approach. For example, students try to play with a toy car with a rebound device.
- Able to communicate with others consciously in order to express their needs. For example, students can express that they want to see the new toy that the teachers are bringing into the class by softly patting their teachers or by making some sound.

L3-2：Students gradually employ common ways of communication.

- Able to find an object hidden in one of three layers of things. For example, teachers can show a big box, a small box and a cloth bag within the sight of the students. Then, they put a 3D printed toy inside the cloth bag and place the cloth bag inside the big and small boxes. Students will open the boxes one by one, search for the toy inside the cloth bag and take it out.
- Try to solve problems in a systematic and feasible way. For example, teachers can put the box with the 3D printed ball on the shelf within the sight of the students, and students can let the teachers know that they want to get the 3D printed ball inside the box.
- Able to use regular communication methods to imitate similar sounds. For example, students can imitate their teachers and say "mobile phones".

- Able to imitate unfamiliar movements through observations. For example, students can imitate how teachers normally turn on the fans.
- Able to predict the consequence of certain incidents that keep occurring. For example, when teachers press the button to stop playing the nursery rhyme, students know that the teachers want to stop playing. Therefore, they will tap the table or say the word "song" to inform the teachers that they want to continue listening.
- Able to retain the memory of the things they have learned for a longer period of time. For example, after the teachers demonstrate how to turn on a toy car, students can turn on the toy car by themselves.
- Able to actively spend longer time exploring an object. For example, students can press different buttons on the toy to explore the ways of activating different functions.

(B) Disciplinary Development Stage (divided into three disciplines: "Communication and Cooperation", "Application and Creation", "Concept and Cognition"):

L4: Communication and Cooperation

- Able to express requests towards technology products of their interests. For example, when teachers take out a tablet, students will express their eagerness to get the tablet with their eyes, voice or gestures.
- Able to express their personal feelings. For example, when teachers switch on students' favourite animation channel, students will say "great" to express their happiness.
- Able to share the movie they are watching with others. For example, share the video that they are watching and watch it together with others.
- Able to use electronic products with others when they receive invitations from others. For example, when teachers invite them to watch a slideshow together, they are willing to join.

L5: Communication and Cooperation

- Able to imitate the way adults use electronic products. For example, students can use a mobile phone to imitate the way adults communicate with others.
- Able to express their desire to operate an electronic product by making sounds or movements. For example, students can make a sound to express their desire to listen to music by turning on the tablet.
- Able to take the initiative to ask others to use electronic products together. For example, when teachers use a tablet to view photos, students can ask if they can watch it together by pulling the teachers' hands.
- Able to use electronic products to share personal information with others. For example, students are able to share personal photos on their phones with others.
- Able to ask for assistance. For example, when the tablet has turned off due to insufficient power, students can ask teachers for assistance.

L6: Communication and Cooperation

- Able to use electronic products to communicate with others. For example, use a phone to talk to others.

- Able to use electronic products to interact with others. For example, share a tablet with others to play games.
- Able to use electronic products with others. For example, take turns to control a remote-control car with classmates and share ideas.
- Able to ask for help and search for their favorite electronic media. For example, ask others to help them search for their favourite videos.

L7: Communication and Cooperation

- Able to collaborate with people to complete simple activities with electronic products. For example, when teachers take out cameras, students can make certain gestures required by teachers for taking photos.
- Able to show others the people that they know on their electronic products. For example, they can recognise classmates in the photos of mobile phones and introduce them to their teachers.
- Able to express their desire for electronic products according to situations. For example, when they want to play video games, they will let others know that they want tablets or let others know that they want mobile phones to make calls.
- Able to work with others using IT tools. For example, students are able to use intercoms to talk with classmates.

L8: Communication and Cooperation

- Able to assist others in solving simple problems on IT products. For example, students can help others charge their electronic products.
- Able to instruct others to use simple IT products. For example, students can instruct classmates to take photos with their mobile phones.
- Able to complete tasks with others using IT products. For example, students can use tablets to draw pictures with classmates.
- Able to use programme dialog boxes with others to set up scenes. For example, students are able to design scenes with MINECRAFT.

L9: Communication and Cooperation

- Able to operate IT products in accordance with others' requests. For example, when teachers ask students to listen to the next song, students are able to play the next song on the computer.
- Able to assist others to use computer peripherals properly. For example, students are able to assist classmates to put the disc into the CD player correctly.
- Able to assist others to use IT products to perform simple search. For example, students are able to use computers to help others search for images of a "puppy".
- Able to use programme dialog boxes with others. For example, use SCRATCH to design simple animations.

L10: Communication and Cooperation

- Able to remind others to follow the rules of the computer room. For example, be able to remind classmates to stop chasing each other in the computer room.
- Able to remind others to take care of the information devices. For example, be able to remind classmates to stop tapping the keyboards.

- Able to share internet information with others. For example, students are able to share weather conditions that they saw on the internet with classmates.
- Able to use program dialog boxes with others to perform more complicated operations. For example, use SCRATCH to design simple games.

L11: Communication and Cooperation
- Able to help others to solve software problems. For example, when classmates use MINECRAFT, they can give their classmates guidance on how to use it.
- Able to use programme dialog boxes with others to build interactive facilities in the scenes. For example, use MINECRAFT to design a scene with a smart power switch.
- Able to share online resources with others. For example, able to share websites about games with classmates.
- Able to follow the good habits of using information products. For example, remind others not to play video games while walking.

L12: Communication and Cooperation
- Able to share information on social platforms with others. For example, upload photos and share with others.
- Able to use online social platforms to communicate with others. For example, students are able to talk to their classmates using Facebook Messenger.
- Able to reject unhealthy information shared by others. For example, students are able to reject information with violent subjects shared by their classmates.
- Able to help others use IT products to solve learning problems. For example, be able to introduce classmates to using websites that can help them search for Chinese character radicals.

L13: Communication and Cooperation
- Able to share electronic files For example, copy images to a portable hard drive and share them with their classmates.
- Able to share information via the internet. For example, be able to upload a group report to the cloud system designated by teachers.
- Know how to refuse to share personal information with others. For example, when classmates ask them to share personal passwords, they know how to reject their requests.
- Able to work with others to use software to edit documents. For example, use computer softwares to edit reports collaboratively.

L14: Communication and Cooperation
- Able to use online resources to collaborate with others. For example, search for culinary tutorial videos and try to cook together with their classmates.
- Able to discuss computer and network information security measures with others. For example, discuss the measures to prevent computer viruses with their classmates.
- Able to express their opinions through internet communication tools. For example, add posts on Twitter to express their opinions towards an incident.
- Able to provide an overview of the importance of respecting intellectual property. For example, state consequences derived from casually sharing unauthorised pictures and songs.

L15: Communication and Cooperation
- Able to remind others to be responsible for their words and behaviour on the internet. For example, when some classmates are bullying others on the internet, they can remind them of the possible consequences of their behaviour.
- Able to work with others to design or create works with multimedia resources. For example, use graphing softwares to insert classmates' drawings and create

drawings together.

- Know how to refuse posting unhealthy information. For example, when someone asks students to post threatening messages, students know how to reject their requests.
- Able to collaborate with others to explore the impact of IT development on personal life, learning and communication. For example, co-authoring a keynote report on "The Impact of Electronic Payments on Our Lives".

L16: Communication and Cooperation

- Able to present their creative works on IT platforms, interact and collect feedback from others. For example, post videos on YouTube, communicate with others and collect opinions.
- Able to interact with others through a variety of internet and social communication tools. For example, be able to use two or more internet communication tools to communicate with others.
- Understand the importance of privacy while using IT to learn with others, know how to protect their privacy and respect others' privacy. For example, when creating PowerPoint slides with classmates, they can remind their classmates not to disclose their personal information or other people's personal information (e.g. personal telephone numbers, addresses, etc.).
- Able to discuss and analyse the trends of IT development with others, as well as its manifold impact on human society. For example, collaborate with classmates to analyse the trends of autonomous driving technology and its impact on social development.

L17: Communication and Cooperation

- Able to use IT tools to share information. For example, use the Google Cloud Sharing function to co-author articles with others.
- Able to use IT to share the diverse culture of Macao with others. For example, create local food videos and upload them to social platforms to share with others.
- Able to actively integrate into the information-based society. For example, browse online materials and compare the prices of different items.
- Able to use different IT resources to organise cross-disciplinary collaborative workshops. For example, create a proposal for student union activities, which includes funding budgets, game designs or workflow.

L18: Communication and Cooperation

- Understand the importance of teamwork and be able to use IT to discuss issues with team members and propose solutions. For example, create short films in small groups and provide solutions for typhoon disaster prevention measures.
- Able to make use of different IT resources to carry out interdisciplinary collaborative learning. For example, be able to use 3D printers in small groups to complete the biology model.
- Able to judge real information and outstanding cultures and promote them. For example, send real-life typhoon news and good deeds of relief works to others.
- In IT teamwork activities, be able to abide by relevant intellectual property laws and regulations with team members. For example, when team members suggest reproducing the completed group work in the form of CD-ROM for sale, they can explore the intellectual property laws with team members.

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L4: Application and Creation

- Express interest in technology products with an intention to explore things. For

example, exploring the remote controls.

- Able to touch the tablet with their fingers to operate it. For example, be able to tap the screen of a tablet with their fingers.
- Able to imitate how adults operate technology products. For example, be able to press the toy's button to make different sounds.
- Able to pay attention to the moving images on the electronic screens. For example, pay attention to the characters in the cartoon that is playing on the screen.

L5: Application and Creation

- Able to actively explore tablets. For example, select the APP that suits their interests and try to operate it.
- Able to use the remote control to operate electronic products. For example, use the remote control to control the toy car.
- Able to imitate adults' skills of operating the technology products. For example, press the "play" button to play a video.
- Able to switch on/off some common IT products. For example, be able to turn on the tablet.
- Able to use phones to contact others. For example, press the button to answer an incoming call.

L6: Application and Creation

- Able to use phones to contact others. For example, press the icon on the phone to call someone.
- Able to respond to instructions that are sent through communication softwares. For example, when the phone rings, the students should be able to press the answer button to answer the call.
- Able to take photos with IT products. For example, be able to press the camera icon on the phone and press the button to take photos.
- Able to properly use the sockets of IT products. For example, be able to plug the power cable into the power sockets.

L7: Application and Creation

- Able to produce simple creation with tablets. For example, be able to turn on the graphing software to draw.
- Able to understand the information displayed by electronic products and perform corresponding operations. For example, charge the tablet when its battery indicator turns to red.
- Able to protect IT products. For example, electronic products should be handled lightly and kept away from water.
- Able to use programme dialog boxes to compose commands. For example, pull the programme dialog box to move the characters.

L8: Application and Creation

- Able to properly follow the steps of turning on/off a computer. For example, press the ⏻ button to turn on the computer and follow the steps on the screen to turn off the computer.
- Able to describe the functions of computer peripherals. For example, keyboards are used for typing.
- Able to use the mouse to perform simple computer operations. For example, use the mouse to move a specified object, click and drag an icon.
- Able to open a popular website with the browser on computer. For example, be able to find out the popular media player websites and their favourite songs.
- Able to proficiently operate the basic functions of tablets. For example, taking photos, or playing videos.

L9: Application and Creation

- Able to select the common functions on the computer according to their needs. For example, be able to press the "Maximize" button to enlarge the window when it is too small.
- Able to explain the basic principles of using computer equipment. For example, be able to take care of the computer and its peripherals.
- Able to use computer peripherals properly. For example, be able to take out and place the CD-ROM /USB Pen into the CD-ROM /USB Pen drive properly.
- Able to use the computer browser to perform simple searches. For example, be able to search for the name of the animation that they want to watch with a browser.
- Able to connect IT products to the internet. For example, be able to connect the tablet to the Wi-Fi when you discover that it is not able to connect to the internet.

L10: Application and Creation

- Able to explain the rules of the computer room. For example, eating is not allowed in the computer room.
- Know how to use the operating system of the computer. For example, open a new folder, move, copy and rename files.
- Able to use the basic buttons on keyboards. For example, be able to use the input keys to jump to the next line or enter the page.
- Able to use the keyboard to enter numbers, English or Portuguese characters. For example, be able to enter their English or Portuguese names and the date of the current day.

L11: Application and Creation

- Able to use the handwriting function to input Chinese characters. For example, be able to turn on the handwriting function and write Chinese characters.
- Able to use the browser to obtain information. For example, enter the keyword you want to find on your browser and search for the right information.
- Able to store, search and read files on the computer. For example, be able to save pictures in the "My Pictures" folder and then open them in the respective folder.
- Able to copy and paste online resources into files. For example, be able to copy online pictures and paste them to Microsoft Paint.
- Able to use IT products in a timely and appropriate manner. For example, do not use IT products for a long period of time.

L12: Application and Creation

- Able to use multimedia resources for learning. For example, be able to use web dictionaries to complete English translation assignments.
- Able to download resources from websites. For example, download images from websites to the computer and retrieve the images from relevant folders.
- Able to proactively explore the features of computer softwares. For example, try to change the colour of the text in the document.
- Able to reject unhealthy information. For example, when an unhealthy advertisement is displayed on the screen, be able to close the window.
- Able to use the common features of a browser. For example, be able to use the "Bookmarks" function to save those frequently visited websites.

L13: Application and Creation

- Know how to protect personal information. For example, do not disclose personal information such as personal address, phone number, ID number, password, etc.

when using the internet.

- Able to properly use different storage devices to store data. For example, be able to store data on a portable hard drive and read data from the portable hard drive if necessary.
- Able to use simple Chinese input methods. For example, the Quick input method.
- Able to use softwares to edit documents. For example, be able to edit letters with word processing softwares.

L14: Application and Creation

- Able to use the keyboard proficiently to input English or Portuguese characters. For example, be able to use the keyboard to input no less than 20 English words every minute.
- Able to properly use computer peripherals to prepare documents. For example, use the printer to print out information.
- Able to set up, manage and use internet communication tools. For example, be able to change the profile picture on Facebook.
- Able to use different search techniques to search for information. For example, be able enter one or more keywords as required to search for images.

L15: Application and Creation

- Able to proactively find out suitable electronic resources according to their needs. For example, they are able to search for the bus routes through an online map before going to a place that they have never been to.
- Able to use multimedia resources to design, create, and present works. For example, be able to use graphic software to create images and save them into appropriate file types as needed.
- Able to use IT for learning and exploration. For example, be able to use the internet to search for information for topical reports.
- Able to use computer software to enhance their computational mindset. For example, use computer information technology to assist in analysing and summarising data.

L16: Application and Creation

- Able to use common text input softwares and hardware devices, and be able to use the Chinese input method proficiently. For example, be able to use the keyboard to input 10 Chinese characters within a minute.
- Able to use the operation systems to manage personal computers proficiently. For example, be able to install, change and uninstall software on the computer.
- Able to connect to the commonly used computer peripherals to transfer files. For example, be able to use the scanner to scan files to the computer and send the files to classmates by email.
- Able to store, read, retrieve, back up, and manage all kinds of files on the PC efficiently. For example, be able to archive files in accordance to certain naming rules and access them quickly when necessary.
- Able to use appropriate digital devices, internet, other hardwares or softwares to obtain the required information. For example, be able to use diverse information device to integrate and produce microfilms.

L17: Application and Creation

- Able to use professional graphic softwares to edit images and create artwork. For

example, Photoshop.

- Able to use document editing softwares to create documents with illustrations. For example, be able to use MS Word software to create a personal résumé.
- Able to configure the printing functions to print out documents, charts, reports, etc. For example, be able to zoom out data in MS Excel to print out all the information on one page.
- Able to actively participate in activities to acquire new IT experiences. For example, enjoy the pleasure of using aerial cameras for shooting or use VR glasses to learn.
- Able to make good use of different IT resources to organise cross-disciplinary autonomous learning. For example, be able to use Micro:bit and different equipment to create a potted plants automatic sprinkler system.

L18: Application and Creation

- Able to use appropriate software tools to create animations, audio and visual multimedia works. For example, use wevideo to create simple short videos, and use powerful filmmakers to create more beautiful audio-visual works for entering into competitions.
- Able to use two or more media to produce creative multimedia works. For example, be able to use photos and sounds for production and know how to synthesise and create multimedia works.
- Able to use appropriate media to publish multimedia works. For example, choose Flickr to post photos and YouTube to publish videos.
- Able to use the Cloud App to process various files online. For example, be able to use Google Docs to edit documents and Google Spreadsheet to calculate data.

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L4: Concept and Cognition

- Enjoy listening to music with media players. For example, when teachers play some music, students show that they are paying attention to the music.
- Able to notice that different CDs can play different contents. For example, different CDs can play different music.
- Able to recognise regular information products. For example, be able to point out a TV or a computer.
- Understand that a screen can play videos and not just an object with luminescence and sounds. For example, when the screen is playing an interesting video, students are able to express their happiness.
- Know how to respond to signals delivered by electronic products. For example, when the phone rings, it indicates that you have to answer the call.

L5: Concept and Cognition

- Able to use a phone to contact and communicate with others. For example, be able to understand the content of a call from relatives.
- Able to point out the functions of the common electronic products. For example: a remote control can operate an appliance remotely.
- Able to recognise the basic functions of tablets, smart phones and computers. For example, they can be used to play games or listen to music, etc.
- Able to point out various functions of tablets. For example, be able to use some apps to play videos and some apps to play games.

- Understand that electronic products should have electricity connections for operation. For example, when an electric toy stops moving, it means that the

battery needs to be replaced, and an electric fan needs to be plugged in in order to turn it on.

L6: Concept and Cognition

- Able to state that a phone can be used to communicate with people.
- Able to tell the usage of the socket of the tablet. For example, they know that a headset should be plugged into the headset socket.
- Understand the concept that electronic products need charging. For example, when a tablet is out of power and cannot be turned on, students can tell that it needs to be charged.
- Know the danger of power sockets. For example, be able to seek adult's assistance when using an appliance or plugging in a power cord to the power socket.
- Know the common functions of IT products in the entertainment business. For example, use a computer or tablet to play games or listen to music.

L7: Concept and Cognition

- Able to distinguish common computer equipment. For example, be able to point out computers, mobile phones or tablets, etc.
- Able to compare and use batteries of different sizes. For example, choose the right size of the battery for different electronic products.
- Understand the messages that are shown on the electronic products. For example, students know that they cannot go online with a tablet if the Wi-Fi icon is not shown on the screen.
- Able to describe the good habits of using IT equipment. For example, be able to show correct postures when operating IT equipment with reminders given by adults and maintain proper distance from the equipment.

L8: Concept and Cognition

- Able to maintain the good habits of using IT products. For example, be able to maintain proper distance and postures without reminders while using computers.
- Able to identify different types of transmission line sockets. For example, be able to use audio transmission lines and USB transmission lines correctly; understand that they should not be used interactively.
- Able to differentiate and match up different batteries with different electronic products. For example, be able to match up different batteries with the relevant electronic products.
- Able to name different input methods that can be used to input texts on electronic devices. For example, write the word "person" on a tablet or use the speech recognition function to read aloud a sentence.

L9: Concept and Cognition

- Able to name some of the common computer peripherals. For example, mouse, screen, and keyboard.
- Know that browsers can be used to perform simple searches. For example, be able to search for a nursery rhyme in the browser when they want to listen to a song.
- Understand the basic maintenance concepts of IT equipment. For example, be able to tell that electronic products should be placed away from water and electronic products are particularly fragile; be able to hold a CD in a proper way
- Able to use IT in everyday life. For example, be able to search for weather information on the internet.

L10: Concept and Cognition

- Able to name some of the basic functions of common computer hardwares. For example, the CPU is the central processor of a computer.
- Able to choose the right computer peripherals. For example, use a printer to print out photos.
- Know the operating system of a computer. For example, be able to tell the purpose of the "Recycle Bin".
- Able to explain the purpose of the internet. For example, be able to point out that we can watch movies and play games on the internet.
- Able to give examples of IT applications in our daily life. For example, be able to point out that we can use the Macao Pass to pay for bus fares and buy snacks.

L11: Concept and Cognition
- Able to explain the correct concepts of using IT equipment. For example, take a break from the computer every 30 minutes.
- Understand the basic operation process of a computer. For example, be able to tell the main process of inputting, processing, storing and outputting.
- Know the process of saving and opening existing files. For example, after saving and closing a file, students can tell the file location to reopen it.
- Able to explain the basic ways of connecting to the internet. For example, be able to point out that connecting to the internet requires a Wi-Fi or a network cable connection.
- Able to name some keywords of some common websites. For example, name the keywords for browsing the sites of YouTube, Facebook and Google.

L12: Concept and Cognition
- Able to tell the purpose of setting up account names and passwords. For example, set up passwords to protect personal information.
- Able to explain the importance of protecting personal data. For example, revealing the account password to others may incur losses.
- Able to learn through different IT channels. For example, use a mobile phone to search for the Chinese character radicals and use the internet to learn the pronunciation of English words.
- Able to distinguish the input and output device of a computer. For example, keyboard and microphone are input devices; screen and speaker are output devices.
- Able to allocate time for the proper use of computers and the internet. For example, they should complete their assignments before using the internet for entertainment purposes.
- Able to respect intellectual property. For example, we should not download or share unauthorised pictures and songs on the internet.

L13: Concept and Cognition
- Able to summarise the main points of respecting the privacy of other people. For example, we should not disclose other people's personal information on the internet.
- Able to briefly explain the basic meaning of a URL. For example, be able to express the meaning of .com, .edu, .mo.
- Able to name some commonly used URLs. For example, be able to tell the web address of Facebook (www.facebook.com).
- Able to distinguish different file types. For example, be able to differentiate visual files, audio files and image files.
- Able to distinguish the meaning of file extensions. For example, be able to tell the common types of file extensions, such as .docx, .jpg, .mp3.
- Able to use the appropriate softwares as required. For example, be able to tell

others that we can use “MS Word” to edit documents and “Microsoft Paint” to draw pictures.
- Able to tell the authenticity of network information. For example, be able to tell that a profile picture may not represent a person’s real appearance.

L14: Concept and Cognition
- Able to summarise the characteristics of different input methods. For example, be able to tell the advantages and disadvantages of the Cangjie input method and the Quick input method.
- Able to identify the characteristics of different storage devices. For example, be able to tell the advantages and disadvantages of CDs/USBs and portable hard drives.
- Able to summarise the basic concepts and functions of the computer network. For example, be able to tell the basic transmission path of information in the computer network.
- Able to tell the characteristics of computer viruses. For example, use the internet to search for the hazards of computer viruses.

L15: Concept and Cognition
- Able to analyse the consequences of different words and deeds on the internet. For example, be able to analyse any possible consequences and responsibilities of spreading rumours on the internet.
- Able to follow the principles of using IT properly. For example, do not use mobile phones to take unauthorised photos of others.
- Able to briefly explain the features of computer hardwares. For example, be able to tell the basic functions of the CPU and RAM.
- Able to analyse the impact of IT development on personal life, learning and communication. For example, be able to give examples of how electronic payment and telecommunications have brought much convenience to people’s lives.

L16: Concept and Cognition
- Able to identify different types of information, their main features and different ways of expressions. For example, be able to differentiate various ways of presenting weather information such as using tables and charts.
- Able to describe the trends of IT development and its multifaceted impact on human society. For example, be able to tell that electronic payment will become the main payment method in the future, so people do not need to bring any cash when they go out.
- Able to summarise the operation principle of a personal computer system. For example, be able to describe the main components of a computer, the roles and functions of the CPU, RAM and the motherboard.
- Able to summarise the types and functions of some commonly used softwares. For example, be able to summarise the main functions of different types of word processing softwares or graphic softwares.
- Able to respect intellectual property, be able to cite the source of information clearly when quoting online information.

L17: Concept and Cognition

- Able to comment on the impact of IT development in Macao on society and daily life. For example, provide comments on whether the electronic payment in Macao is well developed with extensive application domains.
- Able to compare the discrepancies of different multimedia file formats. For example, compare the advantages and disadvantages of jpg, gif and tiff files.
- Able to distinguish the characteristics of some common internet access methods. For example, be able to tell the difference in transmission speed between Wi-Fi and fiber.
- Able to comment on the impact of IT on the modes of learning. For example, be able to tell the pros and cons of using YouTube for learning.
- Able to identify some common computer operating systems. For example, be able to name two or more common computer operating systems.

L18: Concept and Cognition

- Able to comment on the impact of IT development on society and daily life. For example, the use of supercomputers.
- Able to identify different types of computers and understand their similarities and differences. For example, be able to comment on the differences between laptops and tablets, as well as their advantages and disadvantages.
- Able to examine and use IT in a critical way. For example, be able to comment on the positive and negative impacts of IT, and able to use IT in a proper way.
- Able to identify the authenticity of information and judge the applicability and accuracy of data resources. For example, be able to visit two or more websites to verify the credibility of information before citing the information.

Appendix 1

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Appendix 2

Key words

Curriculum Framework for Formal Education of Local Education System

- It refers to a set of curriculum framework formulated by the government to apply to ordinary schools. The content of the framework generally includes the aim, objective and development principle of the curriculum framework, classification of the subjects, arrangement of educational activity period, as well as the learning contents for major subjects at each education level. The formal curriculum in Macao is determined through legislative process.

The Requirements of Basic Academic Attainments

- The Requirements of Basic Academic Attainments refer to the basic qualities that students should possess upon completion of the education levels including the early childhood period, primary school, junior secondary school and senior secondary school education, covering progress in basic knowledge, skills and competence, as well as development in emotion, attitude and values.

Formal Education Curriculum

- The Formal Education Curriculum refers to the curriculum suggested by the government towards all schools, including a series of curriculum documents which specify the curriculum objective and target, learning objective, structure of the subjects, generic skills, values, attitudes and subject instructions.

School-based Curriculum

- The School-based Curriculum refers to the curriculum developed by the school and teachers, in line with the learning status quo of students for the purpose of helping students to realize the educational aim and objective. School-based Curriculum is the balanced outcome between the central curriculum guidance and the professional autonomy of the school and teachers.

Learning Ability Progress Level

- The Learning Ability Progress Level refers to a set of descriptions regarding performance indicators, which are used to express the learning level of students in a progressive manner. The Learning Ability Progress Level of Macao is divided into 18 levels (from L1 to L18), which correspond to the motor sensory development in infancy period, and the learning abilities of students in early childhood, lower primary school, higher primary school and junior secondary school period. Therefore, the Learning Ability Progress Level serves as a shared framework for reference for teachers to assess and report the learning outcome of students.

Attainment Level Descriptors

- The Attainment Level Descriptors, corresponding to the Learning Ability Progress Level, are the textual descriptions on the learning ability of students at each level. The Attainment Level Descriptors apply to all students, including students in formal schools or students with special educational needs in special education schools. Each

descriptor provides reference on the ability level of students within the learning area. The contents of the Attainment Level Descriptors do not represent the whole curriculum nor the learning outcome.

Education Level

- The Education and Youth Affairs Bureau of Macao classifies formal education in Macao into four different educational levels, the early childhood education (3 years), primary education (3 years), junior secondary education (3 years), and senior secondary school education (3 years). Each education level has its own special curriculum framework and requirement for basic academic attainments.

Learning Stage

- The Learning Stage refers to different learning periods for a student in the whole learning process. Generally speaking, a three-year learning period is defined to be a learning stage. The learning stages in Macao include the early childhood stage, lower primary school stage, upper primary school stage, junior secondary stage, and the senior secondary school stage. The learning stage carries slight difference compared to the education level formulated by the Education and Youth Affairs Bureau of Macao.

Students with Special Educational Needs

- Students with Special Educational Needs usually carry one or multiple features of learning difficulty, thus they are in need of special education service. The primary categories of learning difficulty include, listening disorder, visual disorder, physical disorder, mental disorder, learning disorder, emotional and behavioral issues, attention-deficit/hyperactivity disorder, autistic spectrum disorder, dyslexia, and education for intellectually gifted students.

Motor Sensory Training

- Motor Sensory Training plays a significant role in fundamental education. To learn or to engage in cognitive behavior of any kind, students first need to effectively appropriate and perceive, to collect and analyze data or materials. All students need to receive motor sensory training. While most students have naturally mastered the skill in daily life, some students with special educational needs need to enhance and grasp this skill via special motor sensory training experience.

Scheme of Work

- Scheme of Work is the template for the learning units in each subject. Every Scheme of Work specifies the teaching objective of the unit, students' ability level and learning activities, while providing an enumeration of the expected performance for students of different ability levels.

Learning Outcome

- The Learning Outcome refers to the expected learning performance of students upon completion of a course or a certain learning stage. The learning outcome is devised based on the learning objective and learning focus. Therefore, the learning outcome could promote learning by serving as the basis for learning performance assessment

and by reflecting the expected learning performance of students upon completion of a course.

Learning Focus

- The Learning Focus refers to the key contents developed in accordance with the learning objective, providing reference to schools in curriculum design and teaching. The learning focus provides a detailed description on the knowledge and ability to be mastered, as well as the interest, attitude and habits to be cultivated in different learning areas and various learning stages.

Learning Diversity

- The Learning Diversity refers to the learning differences among students in the learning process. In teaching practice, we should cherish the unique talents of each student, attend to their diversified learning needs, adapt teaching methods based on individual needs, help students to discover their aptitude and talents, and provide opportunities for students to create and release their potential towards obtaining appropriate achievements.

Appendix 3

Frequently Asked Questions

1. Is the Learning Ability Progress Level equal to the curriculum? If not, what is the relation between the Learning Ability Progress Level and the curriculum?

   The Learning Ability Progress Level refers to a set of systematically progressive Attainment Level Descriptors. The Learning Ability Progress Level, composed of selected indicative contents from the Curriculum Framework for Formal Education of Local Education System and the Requirements of Basic Academic Attainments, serves the function of assessing the learning ability and learning progress of students. Teachers can refer to the assessment results based on the Learning Ability Progress Level so as to adjust the learning objectives and activities, and to determine the expected learning outcome. However, the Learning Ability Progress Level does not represent the overall content of what ought to be a broader curriculum.

2. Why "The Requirements of Basic Academic Attainments" cannot be directly used to describe learning ability and learning performance?

   "The Requirements of Basic Academic Attainments" refer to the basic qualities that students should possess upon completion of the education levels including the early childhood, primary school, junior secondary school and senior secondary school education. The philosophy behind this concept is based on the generalized performance of the targeted population. For students with special educational needs, designing or formulating learning ability objective merely on the basis of education levels may not adequately reflect their learning process. Therefore, introducing the Learning Ability Progress Level enables full display of the ability level for students with special educational needs at the Progress Level for each learning area, attending to individual differences while improving the step-by-step learning progress.

3. What is the relationship among "The Requirements of Basic Academic Attainments", the Learning Ability Progress Level, and classroom teaching?

   "The Requirements of Basic Academic Attainments" are targeted at students who have completed a certain educational level; the Learning Ability Progress Level refers to the level of learning performance and ability at a certain process, which is aimed at individual students. The former refers to the requirement on learning outcome, while the latter focuses on the learning process. In class teaching, a teacher should always examine students' learning outcome based on "The Requirements of Basic Academic Attainments", and adjust expected learning performance in accordance with their ability level. It should be noted that neither "The Requirements of Basic Academic Attainments" nor the Learning Ability Progress Level constitutes part of the teaching content.

4. When should rating be conducted? Do students all advance by one ability level each year?

   Rating for the purpose of ascertaining learning performance baseline for reference can be conducted at the beginning or at the end of each academic year, or conducted every two years depending on different school conditions. However, rating more than once each year is not recommended. Students with special educational needs exhibit ability diversity. Some students may advance by one or two ability levels within one year, while others may improve one ability level every few years. There are also cases where students with severe learning disorder stay at one certain ability level or even regress due to various physical conditions within more than 10 years of learning experience.

5. As the fundamental stage for the learning area of each subject starts with the motor sensory development stage, will a student with severe learning disorder stay in the initial motor sensory development stage from early childhood period to senior secondary school period, without making progress to learn proper subject knowledge? If so, what is the point of dividing into six subjects?

   Textbook content for each subject is the carrier of learning. The principle for curriculum design is to expand the students' learning experience. The six subjects expose students to different learning situations and objects of different levels, enabling them to develop individual cognition combining their personal experience and perception. Though it is possible that students with severe disorder may stay at the motor sensory development stage even after years of learning, the linked subjects will broaden and enhance student's learning experience. This is the concrete practice of the principle of width and depth in curriculum design. Otherwise, students with severe learning disorder will be exposed to repeated motor sensory trainings over a long time, which goes against the principle of integrated education, or the special education we aspire to achieve.

6. A student starts receiving education at 3 and completes education at 21. If the curriculum is not compiled based on education level, or even if the ability level of students is specified based on a region in the Learning Ability Progress Level, does it mean that students without making improvement in learning ability for over 10 years have to learn the same content from 3 to 21? How are the operational specifications explained?

   The purpose of designing the Learning Ability Progress Level for six subjects is to make it a tool to assess the learning process, rather than to define it as the teaching content. Teachers should adjust the learning content and design the learning experience for individual students on the basis of the regular curriculum. The school should prepare sufficient Scheme of Work for each grade and each subject within each area to cover each learning level, so that students will not learn the same unit repeatedly.

7. Why is the peak level of learning ability set at Form 3 of formal education for special education curriculum in Macao?

   Based on past experience, when highly competent students with special educational needs reach Form 6, their learning performance is similar to formal education students at Form 3. Therefore, we made reference to the learning outcome at junior secondary school in formal education curriculum to describe the levels in senior secondary school (L16-L18) in the Learning Ability Progress Level. If a student's learning performance reaches the level of Form 3 in formal education curriculum, it is not necessary for the student to study in a special education class.

8. Is the teacher for special education required to use the textbooks prepared for the educational level of the students and design the teaching content in accordance with the level of the students' learning ability? Do students learn the same content at different education level?

   The answer is yes. The learning topics/units for students with special educational needs should be the same as students in regular schools, to keep the breath and balance of the curriculum. The age and learning experience of students with special educational need should be taken into consideration by teachers who are specialized in adjusting the teaching content based on the learning ability of students.

9. Currently, most teaching materials for special education class are compiled by the teachers. How will the issue of students' use of textbook in special education class be tackled?

   All teachers should design adequate teaching materials for students. Schools with special education classes may consider forming a network to compile and share the Scheme of Work, which is ideally the long-term development objective for special education in Macao.

10. When the Learning Ability Progress Level and the Curriculum Supplements are completed, how should teachers apply them to teaching practice? What else should be used together with the Learning Ability Progress Level and the Supplementary Guide? How can they benefit the teachers in teaching practice?

    The Learning Ability Progress Level is used to identify indicators of students' learning performance, serving as the shared language for teachers to describe learning performance, which enables teachers to master the learning progress of students. Teachers should not consider the Learning Ability Progress Level to be formal teaching content. The Supplementary Guide serves as guiding documents for special education curriculum, to supplement the formal education curriculum document with special education descriptions. The Supplementary Guide specifies the principles, forms and direction for special education curriculum development. The Learning Ability Progress Level and the Supplementary Guide combined will benefit teacher to understand the ability of students and decide appropriate teaching content.

Appendix 4

Forms

The appendices provide useful documents for teachers to develop the Learning Ability Progress Level. Depending on their concrete situations, schools may adapt these forms accordingly.

1. Record of examples of students' learning performance
   This form is used for the rating coordination mechanism. Schools may use this form to record the collected examples and contents, or to reassess students' learning performance. Details on how to use this form is provided in chapter VI: Rating coordination mechanism and example collection.

2. Scheme of Work
   The Scheme of Work presents the opportunities and feasible practices for students with special educational needs to be educated according to the formal curriculum. The form lists the learning performances of students with different learning ability under different learning areas and objectives. The Scheme of Work can also provide practical suggestions to the teacher to design and improve the teaching plan, teaching contents and activities.

Appendix 4-1

XXX School

Record of examples on student learning performance

<table>
<tr><td>Subject:</td><td>Learning Areas:</td><td>Learning Stage:</td></tr>
<tr><td>Name of Student :</td><td colspan="2">Learning Diversity:</td></tr>
<tr><td colspan="2">Unit Name:</td><td>Date:</td></tr>
<tr><td colspan="3">Teaching Activity:</td></tr>
<tr><td colspan="3">Types of Learning Performance Examples:
performance in class activity
homework
assessment/test
case exploration/ case study
multimedia files(videos/pictures/audios)
self-evaluation
peer review
others</td></tr>
<tr><td colspan="2">Content and description of the examples-initial learning performance:</td><td>Content and description of the examples-review learning performance:</td></tr>
<tr><td colspan="2">Initial Rating:</td><td>Review Rating:</td></tr>
<tr><td colspan="3">Comprehensive Rating:</td></tr>
<tr><td colspan="2">Rating Director: Rater/Subject Teacher:</td><td>Date:</td></tr>
</table>

Appendix 4-2

Annual Scheme of Work of XXX school in xxx Year

Subject:		Learning Areas:		Stage:	
Duration of Learning:					

Unit Name:	
Formal Teaching Goal:	
Teaching Objectives:	Through this unit, students can:
Keywords:	

Teaching Objectives	Examples of Feasible Teaching and Learning Activities and Experience	Performance Descriptors	

Item description:

Item	Description
Unit Name	• selected from the formal curriculum • a common topic that helps to broaden students' learning experience • could inspire students' learning interest
Formal Teaching Goal	• selected from the formal curriculum, specifying that the teaching content originates from the formal curriculum • have enough content for a given teaching session • include the basic knowledge that most students are able to master • in this teaching unit
Teaching Objectives	• divide the formal teaching goal into three to four tasks to reach formal learning goal of the teaching unit • outline the learning objectives within the reach of the students' ability through a given teaching unit, with a precise description of the learning areas for students with special educational needs at various learning levels • use assessable descriptions and encourage students to get involved. For example, students should be able to tell/differentiate/apply the formats of letter writing .
Keywords	• list the vocabulary (around 10 words would be sufficient) students need to use for learning the teaching unit • include keywords that are important and relevant to the subject, so as to enrich the students' ability to express ideas in relation to the subject • place important keywords in prominent locations in the classroom
Examples of Feasible Teaching and Learning Activities and Experience	• adopt student-centered teaching • describe the activities carried out by students • make reference to the formal curriculum when designing activities, adding local cultural elements • design activities targeting the whole class participation in large scale activities to motivate and enhance learning experience • specify activity requirements for students with different learning abilities • nature of activities in line with the age and social experience of students
Performance Descriptors	• describe the performance with reference to the targeted teaching objectives, not the activity performance • refer to the descriptions on the progress level • specify observable learning performance

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In case of any discrepancy between the English version and the Chinese version, the Chinese version shall prevail.