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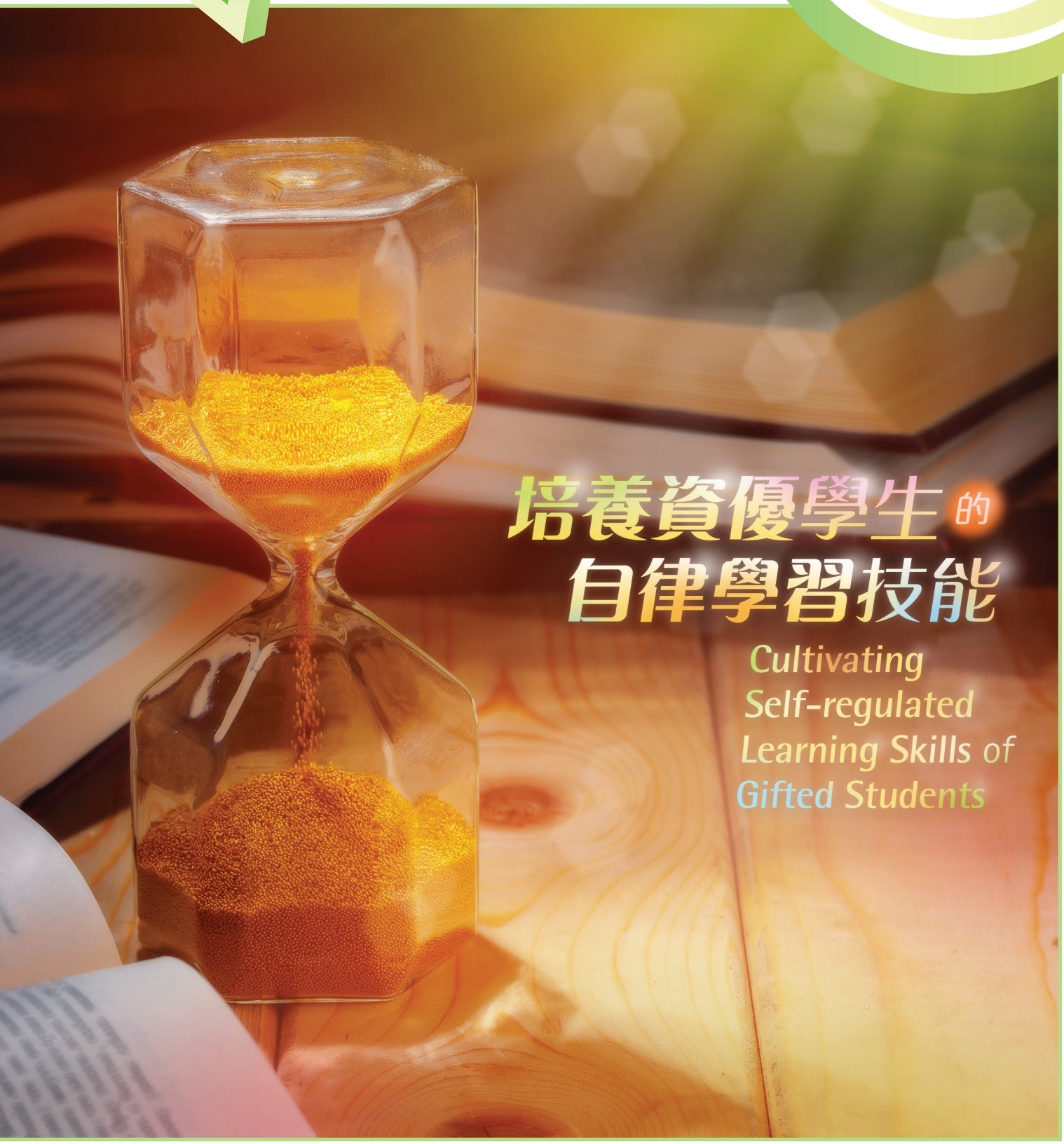
資優 Gifted Gateway 優薈萃



培養資優學生的自律學習技能

Cultivating Self-regulated Learning Skills of Gifted Students

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The Hong Kong Academy for Gifted Education

Gifted Gateway 資優薈萃

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院長的話
From the Executive Director

本人十分榮幸獲委任成為香港資優教育學苑（學苑）的第三任院長。於這所享負盛名的教育機構掌舵剛超過八個月，見證學苑邁向嶄新紀元，一個致力培育及裝備香港年青尖子，迎接充滿機遇而又富挑戰的二十一世紀。

資優兒童通常被視為具有極高智力、非常專注，擁有絕佳記憶力，並且有些時候創意澎湃。然而，現今電腦內存記憶體的成本幾近免費，信息和數據可以儲存在「雲端」而不是我們的腦袋之中，而人工智能每每在我們工作和生活的不同角落挑戰甚或超越人類智能；在這樣的世代中，究竟上述資優特質和技能能否令我們的「超級孩子」脫穎而出？這些「天賦」又是否足以讓具備潛能的學生，在瞬息萬變的未知世界中獨佔鰲頭呢？答案顯然是否定的！要取得成功，資優學生必須掌握自律學習能力，以及二十一世紀的最新技能，例如創新、協作、強效溝通、純熟運用資訊科技、解決問題以及面對逆境的能力等。

在下一學年，為配合不同背景資優學生的需要，學苑將推出嶄新和饒富趣味的課程。課程設計將會更具系統性，部分課程內容會更加深入，從而滿足資優學員熱切追求知識的需要。新課程將包括創業、生物科技、金融科技、量子計算、KOL 網絡紅人培訓、創意寫作、3D 電腦動畫和新興體育運動！當然，我們不單只集中於學術課程，亦會繼續加強學員非認知技能方面的培訓，於學苑內為他們提供全人教育。

今期《資優薈萃》邀請了知名學者和教育家分享他們對資優學生自律學習及獲取這些技能的真知灼見。我們又製作了《逆境逆思系列》，介紹幾位年青校友如何在疫情中透過自律學習，應付公開考試。此外，兩位在海外攻讀博士的校友，亦分享了他們在新冠病毒病風暴下的反思。我們希望透過這些專題文章給讀者帶來啟發，特別是資優同學，須要掌握自律學習技能和積極生活態度，好好的裝備自己。

最後，祝願各位學員在新學年一切順利，並期待在學苑即將舉辦的課程和活動中親身與大家見面。

祝各位萬事順遂、身體健康，並保持積極樂觀的態度，迎接未來！

院長
黃金耀博士

It is my great honour to be appointed as the third Executive Director of the Hong Kong Academy for Gifted Education (HKAGE). With just over eight months of my taking the helm of this prestigious education institution, the HKAGE is now heading into a new era in which the top young minds of Hong Kong will be nurtured and prepared for the exciting and yet challenging 21st century.

Gifted children are often regarded as having exceptionally high intelligence, very focused, having a great memory, and sometimes very creative. But how can these characteristics and skills prepare our 'super children' to excel in the age of the internet and artificial intelligence (A.I.) where the cost of computer memory is almost at no cost, information and data can be stored in the 'cloud' rather than in our heads and where A.I. is challenging and even overtaking human intelligence in every corner of our work and life? Are these 'gifts' sufficient for our talented students to stand out and excel in this rapidly changing and unknown world? The simple answer is no! To be successful, gifted students have to acquire self-regulating learning abilities and be armed with the latest 21st century skills which include innovation, collaboration, strong communication, IT proficiency, problem-solving, as well as the ability to face adversities, just to name a few.

In the coming academic year, the HKAGE will introduce new and exciting programmes to cater for gifted students from all backgrounds. The curriculum will be more structured with some of the courses being more in-depth so as to satisfy the appetite of our most hungry minds. New programmes will include entrepreneurship, biotechnology, fintech, quantum computing, key opinion leadership (KOL) training, creative writing, 3D computer animation, and newly emerging sports! Of course, we will not just focus on academic programmes, we will continue to strengthen the non-cognitive skills of our students so as to provide them with a holistic education here at the Academy.

In this issue of the Gifted Gateway, we have invited renowned scholars and educators to share their insights into self-regulated learning for gifted learners and how to acquire these skills. We have also crafted the Braving Adversity Series featuring how our young alumni tackled public exams and how they exercised self-regulated learning during the pandemic. Furthermore, two alumni who are pursuing their PhD overseas have also shared their reflections amidst the storm of the COVID19 pandemic. These feature articles will hopefully be an inspiration for our readers, especially our gifted students, to equip themselves with self-regulated learning skills and a positive living attitude.

Finally, let me wish our student members all the best in the forthcoming academic year and look forward to meeting you face-to-face in our upcoming programmes and events.

Good luck, good health and stay positive!

Dr Jimmy K Y Wong
Executive Director

人才培育過程中
資優學生的自律學習技能
Self-Regulated Learning Skills for Gifted Students in the Talent-Development Process

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阿爾貝・齊格勒博士・教授

Author: Prof Dr Albert Ziegler
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引言：不單看智商，還要懂學習

大約150年前人們剛開始研究「資優」概念時，沒有人能確切地說出究竟***資優***是由哪些元素構成。當時唯一可以肯定的是：若非資優，就不可能取得非凡成就。二十世紀初，智力商數（智商，IQ）的概念剛剛成形，於是學者們認為他們找到答案了：所謂資優，就是智商遠高於平均水平。回顧過去，科學上曾經出現過各種傳統對資優的定義，其中有些已經不合時宜，但以高智商來定義資優，時至今日依然適用。

然而，資優不只等同高智商，不可與之相提並論，光是擁有高智商未必等如資優。實際上，人們往往忽略

Introduction: Beyond IQ, Toward Learning

At the onset of giftedness research approximately 150 years ago, no one could say with certainty what exactly constituted ***giftedness***. The only certainty appeared to be firmly based on the idea that extraordinary achievements may not be possible without giftedness. At the beginning of the 20th century, soon after the conceptualisation of the intelligence quotient (IQ), scholars believed they had found a solution: gifted people were all those with an IQ far above the average. Although science may look back fondly at traditional yet outdated tenets of giftedness, a modern practice still defines gifted persons based on a high IQ.

Nonetheless, giftedness cannot be reduced to a high IQ and a high IQ alone. Indeed, it is often overlooked that the IQ is a measurement indicating the relative position of a person to an appropriate reference group. If a person has an IQ above

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了智商顯示的是某人在一個適當的參照群體中之相對位置而已。舉例來說，某人的智商若高於100，表示他或她的智商在該群體智商分布的前半部。因此，若每隔數年為同一人進行智能測驗，而其智商一直都高於100的話，那只表示他或她在群體的智商分布中一直處於前半部的相對位置。換句話說，若以為智能是一個不變的常數，那是對智能嚴重的誤解！

讓我們引用一個常用的例子，來釐清上述錯誤的概念。我們可以採用類似量度智商(IQ)的方法，來量度兒童的身高商數（HQ）。一個擁有HQ100的兒童，等如有著同齡兒童的平均身高。而一個HQ130的兒童，則屬於同一個年齡組別中最高的2-3%。若某兒童在三歲和五歲時身高都等如同齡兒童的平均高度，則其HQ同樣是100。當然，該兒童在三歲至五歲時其實很可能已經長高了。正如學前兒童身高會迅速增加，但其HQ維持不變，智能在這個年齡亦會有所增長，但IQ亦維持不變。

就讓我們把資優定義為某人在適當支援下極有可能（在日後）取得非凡成就，那麼資優就不等同智商，也不會像智能那樣隨著成長而遞增。反之，在缺乏適當支援的情況下，資優的程度就會退減。實際上，在眾多不同的人才領域中，個別資優人士可以在很短時間內「失去」其資優特質，而隨著時間過去，日復日得不到支援的話，最終都可能降低某人取得非凡成就的可能性，

100, it means that he or she is in the top 50% of the IQ distribution. Therefore, if a person's intelligence is measured at a few intervals, and consistently presents with an IQ above 100, then only his or her relative position in the top half of the IQ distribution has remained the same. In other words, it is a gross misconception to assume that intelligence is a constant that remains the same!

The easiest way to bring clarity to the latter misconception depends on an oft-used example. Quite similarly to an intelligence quotient, one could also measure a 'height quotient'(HQ). A child with an HQ of 100 has exactly the average height. A child with an HQ of 130 belongs to the tallest cohort of children, approximately 2-3% of its age group. If a child presents within the figures for average height at the age of three and again at the age of five, results would be illustrated by an HQ of 100. But of course, it is likely that the child has grown between the ages of three and five. And just as height increases rapidly at preschool age while HQ remains the same, intelligence also increases at this age, and IQ remains the same.

Let us simply define giftedness as a high probability that someone could (later on) accomplish extraordinary achievements with appropriate support. Consider that giftedness then does not remain the same as IQ, nor does it increase like intelligence during development; instead, giftedness decreases without appropriate support. As is true across many talent domains, a gifted individual can, in fact, 'lose' his or her gift rather quickly. Every day that passes without support may ultimately reduce the likelihood of achieving excellence; at some point in the span of (human) development, the proverbial space of gifted possibility can shrink until it is no more.

Such conceptual inconsistencies with intelligence and IQ were compounded by empirical problems in the research. For example, as children, future Nobel Prize winners were excluded from giftedness studies because their IQ registered below the set threshold of IQ points. As a result, giftedness research gradually turned its sights toward learning and pedagogy.

(S)He Who Learns, Becomes More Gifted!

Most learning interventions have the surprising effect of widening existing achievement gaps. Although students in the lower achievement spectrum also benefit from additional support, they do not benefit as much as students in

直至到達某個（個人）成長階段，昔日曾經因為資優而期許成就非凡的可能性，甚至乎會退減至蕩然無存。

從研究觀察所得的經驗，亦強化了智能不等同智商的概念。舉例來說，一些獲得諾貝爾獎的人士，童年時卻因為智商未達到所訂標準而未有參與各種資優研究。有見及此，研究資優的重點遂逐漸轉移到學習和教學法。

學得越多，越是資優！

大部分學習干預措施都會拉闊學生之間當前的成就差距，效果令人驚訝。成績稍遜的學生雖然也會因為支援增加而得益，但獲益程度卻不及成績較佳的學生。這種現象稱為「馬太效應」。

兒童早期認字的情況正好是馬太效應的最佳佐證。閱讀能力強的兒童通常具備較豐富的詞彙量和常識，這兩點令他們閱讀時更輕鬆。相比於對閱讀感到困難的兒童，閱讀能力強的兒童更加喜歡閱讀，而越多閱讀越能豐富他們的詞彙和知識。另一方面，有閱讀困難的兒童能掌握以支持早期認字過程的詞彙和知識都較少，以致他們要理解文意就更覺困難。舉例來說，他們付出較多努力，但閱讀進度依然較慢 —— 這些都會降低他們閱讀的意慾，削弱他們努力彌補自己不足的動力。事實上，那些早期已有閱讀困難的兒童，要趕上成績較佳的同儕，確實是一項艱鉅的任務，因為後者能夠從同等的支援中獲益更多，前者卻恰恰相反，故此後者的成績總是領先於班上其他同學。

另外，透過研究於同一日出生的兒童所得的數據，亦顯示出學習的自我強化作用。有些國家如果兒童的出生日期跟規定可申請入學的截算日期十分接近，則家長可以選擇讓子女提早入讀小學（孩子會比班上大部分同學年幼），又或者讓子女在幼兒園多留一年。該項研究把提早入學的幼兒與暫緩入學的幼兒作一比較，同時確保兩組兒童是真正相若，例如具備相同智商。該兩組兒童稱之為「統計學雙生兒」。讓我們看看他們入學後首數年的情況：

當暫緩入讀小學的兒童（甲童）繼續接受幼兒園程度

the higher achieving spectrum. This effect is called the Matthew Effect.

The Matthew Effect is best illustrated through early literacy gains. Children who read well usually have a higher vocabulary and greater general knowledge. A higher vocabulary and greater general knowledge make it easier for them to read. They read more than the children who find reading more difficult which in turn, increases vocabulary and knowledge. Children with reading difficulties, on the other hand, have less vocabulary and knowledge with which to buttress the early literacy learning process, i.e., it is more difficult for them to understand the text. For example, they read more slowly and with more effort – all of which makes them less likely to read and therefore, less likely to work through the deficits. Indeed, it is a daunting task for children like those with early reading difficulties to catch up to peers that possess an achievement advantage because the latter cohort benefits more from the same support measures, placing them perpetually further ahead than the rest of the class.

Another example of the self-reinforcing effects of learning includes research figures from studies on children born on the same day. In some countries, if this day is close in time to the cutoff date set forth by regional education stakeholders, parents have the choice of enrolling their children in school earlier (the child is generally younger than its classmates) or sending them to kindergarten for another year. Research studies compare young children who are enrolled in school with those who are not. Moreover, studies have taken care to ensure that these children are truly comparable; for example, that they have the same IQ. These children are referred to as statistical twins. Let's think about what will happen in the first years of school attendance:

While the child not-yet-enrolled in school (child A) will continue to receive cognitive support at the kindergarten level, the child that is enrolled in school (child B) will already receive the more challenging cognitive support required of the first grade of elementary school. Later, when child A finally makes it to the first grade of elementary school, child B will be at an advantage, receiving the cognitive support required of the second grade. Whenever child A does receive a level of support comparable to that of child B, child B will have already achieved the more challenging learning goals. In fact, child B who started school earlier, also gains a higher IQ increase every year – an IQ boost that eventually adds up in subsequent years.

的認知支援時，已入讀小學的兒童（乙童）已在接受更具挑戰性的小一程度認知支援。及至甲童入讀小一時，乙童已接受小二程度的認知支援，處於更具優勢的情況。儘管甲童與乙童所得支援相若，乙童卻已達到了更具挑戰性的學習目標。事實上，乙童因為較早入學，每年的智商增長也都較高，而所增長的智商最終會在隨後幾年累計起來，顯出更大的果效。

這些研究結果顯示，具挑戰性的學習機會可以彌補因資優而產生的優勢差異。這種正反饋效應意味著即使對於高度資優的學生，（早期的）學習和支援上的優勢仍然至關重要，無法在日後追補。換句話說，當我們學習，學習能力便會相應提升；而越多學習就可以學到更多。學得越多，就越資優。

有關學習支援的三個重要研究方向

學習技能是構成資優的核心元素這項發現，由三個尤其重要的研究方向支持。首先，幾乎所有最終能達到較高成就水平的學生，都有一個或多個個人「師傅」。在指導「徒弟」改善學習和提升學習技能方面，「師傅」的角色極其重要。關於如何為資優學生提供最佳學習支援的現有知識，很多都可以在「師徒」關係中觀察得到，又或是應用在其中。

第二個重要的研究方向是有關專家的研究，即研究對象為國際上持續表現超卓的人。有趣的是，不同領域（數學、音樂、體育等）的專家跟那些表現較為一般的人相比，其學習在三方面有所不同：1）專家的學習時間更長；2）他們的學習更為優質（例如使用學習策略及對學習進行監察）；3）他們獨自進行大量學習。例如，世界一流的音樂家經常獨自練習，但業餘音樂愛好者則更喜歡與別人一起玩音樂。

第三個重要的研究方向把成績最好的學生跟成績一般的學生作一比較。有趣的是，研究人員發現除了一如最初估計，兩者在使用學習策略方面有所差異之外，在其他方面亦存在差別。事實上，成績優秀的學生在關乎學習的各方面表現都遠較同儕優勝。這些傑出的表現可以透過學習過程模型來說明：以自律學習來

Such findings show that challenging learning opportunities can compensate for advantages attributed to giftedness. This positive feedback effect means that despite higher levels of giftedness, (early) learning and support advantages are critical and cannot be compensated for down the line. In other words, as we learn, we improve our ability to learn; and so, by learning, we can always learn more. In truth, the more we learn, the more gifted we become.

Three Important Strands of Research on Learning Support

The finding that learning skills lay at the core of giftedness is supported by three particularly important strands of research. First, virtually all learners who eventually reach high levels of achievement were found to have one or more personal mentors. Mentors were invaluable in helping their mentees improve their learning and their learning skills. Much of what is known about optimal learning support for gifted learners can be observed and adopted in mentor-mentee relationships.

A second important research strand is research on experts, i.e., persons who consistently demonstrate outstanding performance at an international level. Interestingly, the learning of experts in all domains studied (mathematics, music, sports, etc.) differed from the learning of average performers by three characteristics: 1) experts had much longer learning times; 2) their learning was qualitatively much better (e.g., learning strategy used and monitoring of learning); and 3) they learned an exceptional amount alone. For example, while world-class musicians reported frequently practicing their musical instruments alone, very good hobby musicians preferred to make music together with other people.

A third important strand of research compares the most successful learners to students with average learning outcomes. Interestingly, the differences were found beyond the use of learning strategies where the researchers' initially estimated disparities may be found. In fact, successful learners performed significantly better than their peers in a whole range of other aspects of learning. This superior performance can be illustrated in a process model of learning: consider self-regulated learning, during which learning strategies are an important component but not the only component, among other key processes.

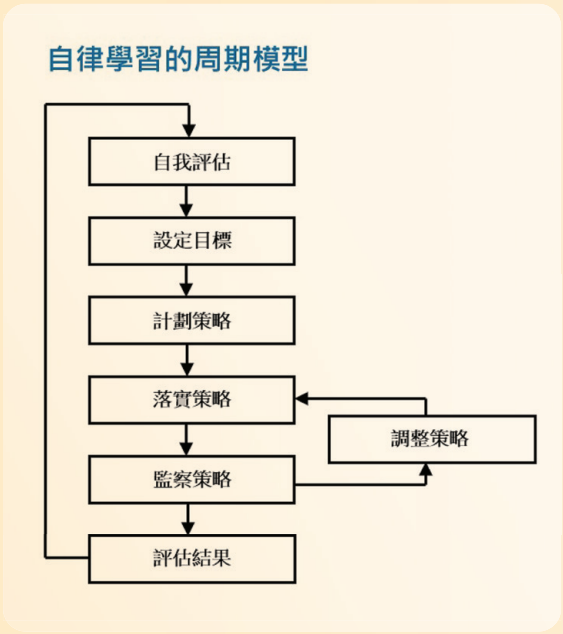
Self-regulated Learning

My colleague, Prof Heidrun Stoeger, from the University of

說，學習策略是重要的組成部分，但在芸芸關鍵過程中，並非唯一的部分。

自律學習

德國雷根斯堡大學的海德倫・斯托格教授和我以七個步驟的周期總結了自律學習過程（見圖一）。自律學習始於學生首先評估學習要求、主題細節及自身能力。在這過程中，學生按先前的學習經驗，把當前的學習和任務要求跟自己當時的知識和能力水平聯繫起來，結果他知道自己當前需要學習甚麼。



圖一

根據自我評估，可在周期中第二步設定學習目標。當中要求學生能夠制定和擬備具體目標。在自律學習的培訓課程中，學員會學習自行設定在某段可管理時期內的功能目標，該些目標是針對該學員而特別制定的主觀挑戰。

周期中第三步是計劃學習過程中的策略。學生須考慮自己最適宜怎樣學習（例如使用何種學習策略），以達到第二步設定的學習目標。要做到這點，學生需要懂得大量學習策略。

Regensburg, and I have summarised the sub-processes of self-regulated learning in a seven-step cycle (see Figure 1). Self-regulated learning begins with the learner first assessing the learning requirements, the specifics of the subject matter, and his or her own competencies. In doing so, he or she relates the current learning and task requirements to his or her current level of knowledge and competence against the background of previous learning experiences. As a result, he or she might now know what has to be learned.

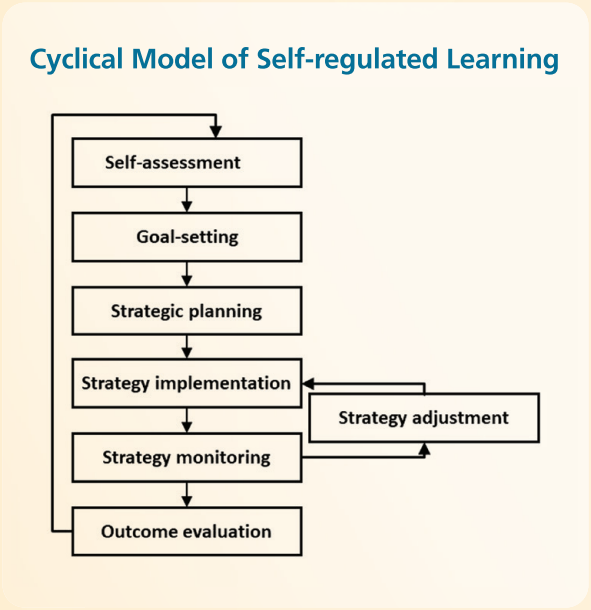


Figure 1

Based on the self-assessment, a learning goal can be derived in the second step of the cycle. This requires that students be able to make and formulate concrete objectives. In training courses for self-regulated learning, for example, trainees learn to independently set functional goals that extend over a manageable period, that are specifically formulated, and represent a subjective challenge.

The third step of the cycle involves strategic planning of the learning process. Learners should consider how they might best learn (e.g., what learning strategies they might use) to achieve the learning goal set in the second step. To do this, learners need a rich repertoire of learning strategies.

In the fourth cycle step, strategic planning is implemented in practice, resulting in strategy application. This corresponds

周期中第四步是落實策略計劃，亦即應用相關的策略。這一步大致相當於傳統學習理論中的學習過程。然而，這裏所指的學習更強調有意識地計劃的策略性學習。學生必需具備有效應用學習策略、並完全專注於學習的能力。

周期中第五步是監察策略，指的是有系統地監察自己的學習過程，這一步是應用新的學習策略時不可或缺的，而檢視所選用的策略是否確實有效十分重要。因此，計劃和落實策略的過程都要進行測試，而學生必須具備反思自己學習行為的技能。

學生如發現自己使用某個策略的效果未如理想，則應在周期中第六步調整策略，學懂其他學習策略，並有勇氣改變自己的習慣。自律學習的培訓會鼓勵學生透過各種方法，不斷改進和優化自己的學習。

周期中最後一步是評估學習結果。在第二步所設定的學習目標，經採用相關學習策略後，達到了多少？當開始另一個周期時，對結果的評估就成為自我評估（周期中第一步）的基礎。要達致評估的目的，這個步驟就不能單按既定要求和個人學習進度來對照自己的表現，而是必須下更多工夫。

總結

對於所有資優學生、他們的家長和老師，以及任何關注自身成長的人來說，好消息是：自律學習是可以學回來的。研究人員和教育工作者已經就自律學習周期的每個步驟設計了成熟而完善的改進方法。然而，重要的是當中每一步都必須加以培訓和操練，否則就會如俗語所說，「一著不慎，滿盤皆輸」。另一點需要注意的是，有效的學習比擁有高智商重要得多。現代對資優的觀念跟數十年前已大不相同：高效能的關鍵在於有效學習，而有效學習***源出於***自律學習。

roughly to the learning process as it is thematised in classical learning theories. However, learning is now much more strongly understood as consciously planned, strategic learning. The necessary competencies of the learner consist of applying learning strategies in a high-quality manner and devoting full attention to learning.

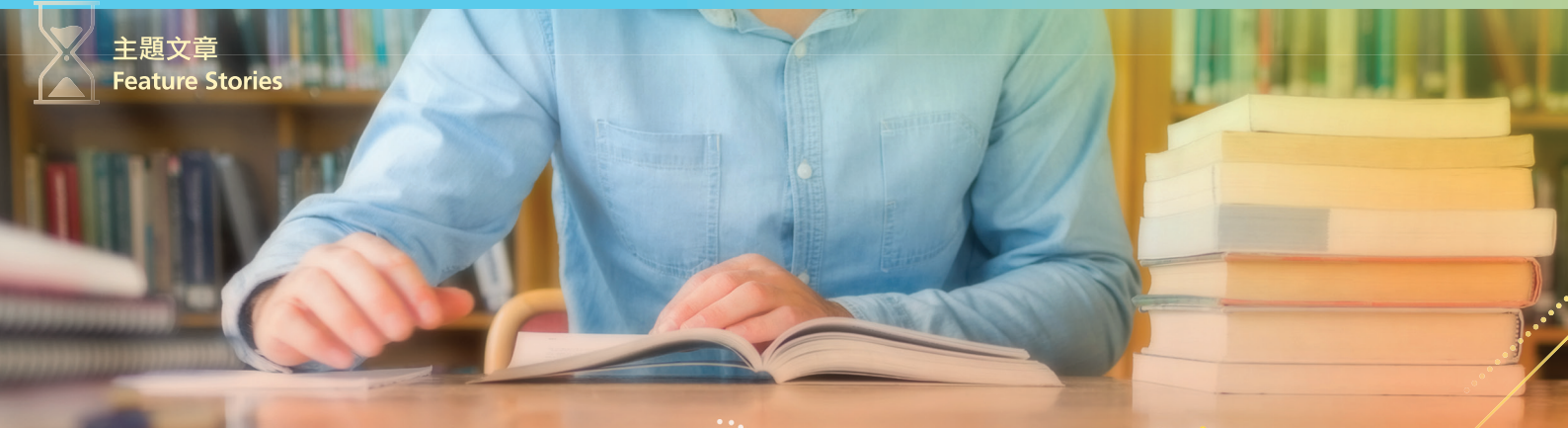
The fifth cycle step is strategy monitoring, in which one's own learning process is systematically monitored. This is particularly essential when a new learning strategy is applied. It is important to check whether the selected strategy actually works. Thus, both the strategic planning and its implementation are put to the test. Learners must have the skills to reflect on their own learning behaviour.

If a learner finds that he or she is not yet using a strategy optimally, he or she should make a strategy adjustment in the sixth cycle step. This requires knowledge of alternative learning strategies and the courage to change habits. In self-regulated learning training, learners are encouraged to continuously improve and optimise their own learning through various measures.

In the last cycle step, the learning outcome is assessed. How well was the learning objective set in the second cycle step achieved with the help of the learning strategy procedure? The outcome assessment serves as the basis for self-assessment (step 1 of the cycle) when the cycle is run through again. For this purpose, students must do more than comparing their performance in relation to given requirements and individual learning progress.

Concluding Remarks

The good news for all gifted learners, for their parents, teachers, and anyone interested in their personal development is that self-regulated learning can be learned. For each of the cycle steps, researchers and practitioners have developed sophisticated methods of improvement. However, it is important that all cycle steps are trained for and exercised. The adage that a chain is as strong as its weakest link is certainly correct in this case. It is also worth noting that effective learning is incomparably more important than a high IQ. Modern conceptions of giftedness now differ from those of a few decades ago: The key to high performance is effective learning that is ***rooted*** in self-regulated learning.



培養學生「自我主導學習」之道

Nurturing Students' Self-directed Learning at School-wide / System Level

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Authors: Dr Yip Chi Sio (Principal), Mr Tsoi Ka Wing, Mr Mak Ying Yin, Munsang College

資優教育分享（學術培養、情意教育、真實體驗）

在21世紀教育下，資優學生在學術和非學術領域都享有很多加速和深化學習的機會。然而，雖然不同領域均有眾多發揮潛能的機會，但部分資優學生卻因為獲邀參加不同機構舉辦的資優教育活動和課程過多，令他們應接不暇，壓力倍增。此外，亦有資優學生在尋求學問的過程中 ，失去了熱情和方向。因此，對於資優學生來說，學會成為「自我主導學習者」尤其重要，惟有在清晰目標之下，他們探求新知的熱情、決心才得以持續，潛能才得以展現。

「全校參與」推行資優教育

為確保學生得以在跨學科層面及非學術領域獲得啟發及實行資優教育的「三層架構推行模式」，民生書院（書院）領導層必須確定每位教學同工對資優教育均有相當認識程度。書院所有教學同工均已修畢教育局提供的資優教育網上基礎課程，了解資優學生的特質及如何把資優教育融入課堂。書院行政部門又把資優教育三層架構的推行工作納入書院年度計劃和報告中，務求各學科主任和部門主管策劃教學活動時，更有意識地融入資優教育的元素，例如在日常評核和考試加

Gifted Education Sharing (Academic, Affective, Authentic)

In the educational context of the 21st Century, gifted students are provided with many chances to accelerate and deepen their learning on both academic and non-academic fronts. Although there are many opportunities for them to realise their potential in different areas, it is found that some gifted students are stressed as they are invited by various stakeholders to participate in various activities and programmes. In addition, some of them have lost their passion and direction throughout the journey of knowledge pursuit. Hence, being a self-directed learner is important for gifted students as it is the key for them to become sustainably passionate and determined in exploring and realising their potential.

Implementation of Gifted Education — Whole School Approach

In order to ensure that the three-tier implementation model for gifted education is considered and executed at a cross-subject level and in non-academic areas, the school administration has to guarantee that every member of the teaching staff has a certain level of understanding of gifted education. In Munsang College (the College), all teaching staff have completed the online foundation course offered by the Education Bureau to understand the features of gifted students and ways of incorporating gifted education in their lessons. The three-tier implementation for gifted education has been included in the school annual plan

自左至右：蔡家榮老師、葉志兆博士（校長）、麥應賢老師
From left to right: Mr Tsoi Ka Wing, Dr Yip Chi Sio (Principal), and Mr Mak Ying Yin

入不同的層級的評估方案和挑戰題。此外，聯課活動委員會也推行「多元化人才師友計劃」，為視覺藝術、音樂和體育方面的資優學生提供師友式培訓和指導。「全校參與」，亦即動員所有教學同工推行資優教育，確保為資優學生提供不同活動和課程，而教師隨時隨地預備指導及支援學生，發掘他們的天賦，讓潛能得以發揮展現。

為具卓越表現的資優學生提供情意教育

「自我主導學習」的學生是具有高度主導性、動力、熱情和決心，他們矢志在自己感興趣的領域脫穎而出。然而，資優學生往往是完美主義者，遇上挑戰和面對困難考驗時，動力和決心可能難以維持，為了避免失敗，他們或許會放棄某些機會或不願參加某些比賽。另外，有部分資優學生不認識自己的人生目標和個人興趣，以致對各種資優教育活動和課程感到厭煩。因此，我們有必要為資優學生提供情意教育，讓他們掌握壓力管理技能，明白個人獨特之處。例如，正念練習便有助管理壓力，讓同學進行反思；而領袖訓練營則可促進團隊精神，培養毅力和意志。情意教育能提高資優學生的自我意識、促進自我了解和提升抗逆能力，鼓勵他們承擔若干程度的風險，勇於接受挑戰，故此對提高資優學生的「自我主導學習」能力至為重要。

為資優學生設計「真實學習體驗」

由於教學的過程已從過往教師主導轉為學生主導，因此必須為資優學生提供「自我主導學習」，加強他們在學習和求知過程中的自主意識，否則學生便可能無法在「自我主導學習」的過程中，維持動力和決心。我們會以書院的模擬聯合國（MUN）活動作為例子，說明為「自我主導學習」的資優學生設計和提供真實學習體驗的重要性。書院自 2015 年起參加香港模擬聯合國活動和哈佛模擬聯合國（亞洲）會議。初時，我們挑選成

and report so that subject and department heads would have a stronger awareness to incorporate gifted education elements in their plans. For example, various tiered assessments and bonus questions are included in daily assessments and examinations. The Co-curricular Activities (CCA) Committee has also launched the Diverse Talent Mentorship Programme to provide mentorship and guidance to students gifted in visual arts, music, and sports. The Whole School Approach (WSA) which includes all teaching staff in implementing gifted education can hence guarantee the provision of various activities and programmes to gifted students while teachers are ready to provide guidance and support for the gifted students to explore and realise their potential.

Provision of Affective Education to High Achievers

Self-directed learners are characterised by their high level of self-initiative, motivation, passion and determination to excel in their areas of interest. It is common for gifted students to be perfectionists and their motivation and determination may not be easily sustained when they encounter challenges and difficulties. They may give up chances or refrain from participating in competitions in order to avoid potential failure. On the other hand, some gifted students have not identify their life goal and interest and they may be fed up with gifted activities and programmes in different areas. Hence it is important to provide affective education opportunities for gifted students so that they can develop their stress-management skills and understand their uniqueness. For example, mindfulness practices can help them manage stress and let them have self-reflection. Leadership training camps can facilitate team building and cultivate perseverance and determination among participants. Affective education is essential to facilitate the nurturing of gifted students in self-directed learning as it can enhance their self-awareness, self-understanding, and resilience; and encourage them to take a certain level of risk and embrace challenges.

Designing Authentic Learning Experiences for Gifted Students

As the teaching and learning process has been shifted from teacher-centred to student-centred, it is essential to provide gifted students with authentic learning experiences to boost their sense of ownership in learning and pursuit of knowledge. Otherwise, self-directed learners may not be able to maintain their motivation and determination. Activities of the Model United Nations (MUN) carried out in the College will be used to illustrate the importance of design and provision of authentic learning experiences for self-directed gifted learners. The College has started participating in local MUN programmes and Harvard Model Congress Asia since 2015. At first, high achievers were selected to participate in the programmes. Yet it was observed that those high achievers did not actively participate in the programmes and they could not learn much from it. After debriefing with the participants, it was learnt that they were not particularly interested in the discussion on controversial global issues. The limited learning

績優秀的同學參加這些活動。然而我們觀察到，那些成績優秀的同學沒有積極投入參與，亦無法從中學到很多東西。其後我們跟那些同學傾談，得知他們並不特別熱衷於討論具爭議性的全球議題。該次學習成果有限，原來跟同學的學習能力無關，而是因為缺乏動力和興趣。經過評估後，我們轉而鼓勵對活動感興趣但表現未必最出色的同學自薦參加。我們發覺，對活動深感興趣的同學，會更主動和願意學習，並發展自己的潛能。他們更有動力為比賽作好準備，又會設法提高自己的語言能力、辯論技巧和全球意識。這些經驗表明，真實的學習體驗能夠大大提升學習成果，促進資優學生的學習動機，讓他們具備「自我主導學習」的能力。

疫情中的聯課活動（確立抱負、整裝待發、付諸實行）

作為教師和教育工作者，我們大都熟悉「甚麼」、「如何」、「為何」這些疑問詞。很多時我們會告訴學生要學習甚麼、如何學習，以及為何要學習。學習目標對於課程策劃至為重要。近年有些教師會在課堂開始和結束時，向學生表述並簡介學習目標，讓他們更了解課堂的預期成果和將會採用的學習策略。這些認知有利於課堂教學。另外，在培養學生「自我主導學習」時，我們往往更關注「為何」這個問題。告訴學生「為何」要學習，可以提高他們的外在和內在學習動機。對於資優學生，教師可以考慮 ***問他們為何*** 要學習，而不是 ***告訴他們為何*** 要學習 。資優學生學習能力較高，應可在老師指導下自行探索學習某個主題背後的意義。如果能夠解決「為何」這個問題，資優學生便更

outcome was not related to the students' academic ability but the lack of motivation and interest. After evaluation, we encouraged students who were interested in the programmes but might not be academically excellent to join through self-nomination. It is found that students showing strong interest in the programmes are more active and willing to learn and develop their potential. They are empowered to prepare for the competition and find ways to enhance their language proficiency, debating skills and global awareness. This experience shows that authentic learning experiences can maximise the learning outcome by enhancing the motivation of gifted students, hence equipping them as self-directed learners.

Co-curricular Activities amid Pandemic (Aspiring, Articulating, Actualising)

Most of us, as teachers and educators, are familiar with the question words 'What', 'How', 'Why', etc. On numerous occasions, we tell our students what to learn, how to learn and why they have to learn. Learning objectives are essential for lesson plans. In recent years, some teachers show the learning objectives and brief the students at the beginnings and ends of lessons. Students could understand more about the expected learning outcome and the learning strategies to be adopted in the lessons. Such metacognition is conducive to effective learning and teaching in the classroom. On the other hand, when it comes to nurturing students' self-directed learning, we often focus more on the question word 'Why'. By telling students why they have to learn, their learning incentives and motivations could be boosted. For gifted students, teachers shall consider ***asking them why*** they have to learn instead of ***telling them why*** they have to learn. With higher learning capability, gifted students are expected to explore by themselves the meaning behind learning an issue or topic under teachers' guidance. With the question 'why' being resolved in their mind, gifted students would be more likely to initiate and sustain self-directed learning.

Principal of Munsang College, Dr Raymond Yip Chi Sio, met student leaders of the previous academic year and presented them each a book *Start with Why* written by Simon Sinek. Words of encouragement were given to the student leaders and it is believed that they would have a unique learning experience if they could make sense of the adversity and abnormality they faced during the year. At the beginning of the current academic year, the election of student bodies including committee

容易開始並維持「自我主導學習」。

書院葉志兆校長跟上學年的學生領袖會見，向他們贈送賽門．西內克（Simon Sinek）的著作《先問，為甚麼》以茲鼓勵。我們相信，同學面對去年的逆境和非比尋常的情況，如能體會當中意義，必能把負面思想轉化成為獨特的學習體驗。今年開學之初，各學生組織，其中包括學生會和六個社的執委會，都在網上進行了選舉。獲提名的內閣和候選人在網上進行助選活動，宣傳各項計劃和建議。同學為這些網上助選活動付出的努力，絕不少於實體助選活動。學生領袖的熱忱在當中展現無遺，他們亦已作好準備，應對前面種種挑戰。2020-21年度學生領袖的就職典禮在書院禮堂舉行時，沒有觀眾在場。典禮過程經錄影後，於班主任課播放給所有同學觀看。這些學生領袖都已準備好在社會動盪和疫情的非常情況下，承擔起領袖角色。書院致力幫助他們「***確立抱負***」── 即本段標題中第一個「A」***(aspiring)***，希望他們能夠自強不息，發揮創意，服務同學。

除了培養抱負，書院又為學生領袖提供不同培訓，支援他們承擔起自己的角色和責任。這跟本段標題中第二個「A」***(articulating)*** ──***「整裝待發」***互相呼應。為遵行教育局指引，疫情期間書院暫停一切實體聯課活動。領袖培訓改於網上進行。校長先向負責各學生組織的教師提供培訓，再由該些教師培訓學生領袖。學生領袖繼而調整該些培訓內容，再為其組織的成員提供培訓。

書院不僅為一小撮學生提供領袖培訓，因為我們相信，每位同學的領導才能或潛質都應該得以鍛煉。近年書院主要關注的其中一項工作，是培育年輕一代成為朝氣蓬勃、富有活力的人，亦即：***(i) 鍛鑄學生的自我管理和抗逆能力、(ii) 協助學生盡展多元潛能，俾能卓絕群倫，以及 (iii) 培養學生關心國家及世界事務，並擁有世界公民意識。***疫情無疑會干擾到書院慣常的活動和工作，故此我們必須探索替代模式，讓同學可以繼續從體驗中學習。書院為同學提供機會，盡量讓他們發揮創造力、領導才能、團隊精神..... 等。我們相信，同學從實踐中學到的，必定比從理論中學到的多。換言之，書院鼓勵同學經過周詳計劃後，把自己的想法付諸實行，最後檢討整個過程，從中有所學習。為人熟知的「規劃、實施、評估（PIE）」模型中「實施」的部分，跟本段標題第三個「A」***(actualising)*** ──***「付諸實行」***同出一轍。以下是書院如何在疫情中

members of the Student Association and Six Houses were conducted online. Online campaigns were launched by the proposed cabinets and candidates to promote their plans and proposals. The effort spent on these online campaigns were actually no less than on the face-to-face ones. Student leaders demonstrated their passion and commitment and are now more than ready to handle the challenges ahead of them. The inauguration ceremony for student leaders of 2020-21 was conducted in the school hall without the presence of any audience. The ceremony was recorded and broadcasted to all students during the class teacher period. Student leaders of 2020-21 are well prepared to assume their role amid abnormalities caused by social unrest and the pandemic. The school has nurtured in them the sense of ***aspiration*** – the first 'A', in hope that they could be self-initiative and exercise their creativity in serving their fellow schoolmates.

Apart from nurturing aspiration among students, the school also prepares various training for student leaders in order to empower them for their roles and responsibilities. This echoes the second 'A' – ***articulation***. To observe the EDB guidelines, no physical CCA is allowed amid the pandemic. Leadership training sessions are conducted online via virtual meetings. The principal provides training to teachers-in-charge of student bodies and the teachers provide training to the student leaders. Student leaders are empowered to adjust the leadership training activities and provide further training to their fellow group members.

Leadership trainings are not limited to a small group of students as we believe that every student shall have their leadership qualities or potentials to be polished. One of our school major concerns in recent years is to groom our younger generations into dynamic individuals, i.e., to: ***i) hone students' self-management and resilience skills, ii) support students with diverse talents to excel in their areas of interest, and iii) nurture students' global citizenship and awareness of national and global issues.*** The pandemic undoubtedly disrupts school routines and operations; thus, alternative modes must be explored in order to sustain students' experiential learning. Opportunities are given to students to exercise their creativity, leadership, teamwork, etc. as far as possible. We believe that students can learn more by doing than from lectures. In other words, the school encourages students to implement their ideas after thorough planning, and eventually learn from evaluating the whole process. The 'I' in the well-known 'Planning-Implementation-Evaluation (PIE)' model is in line with the third 'A' – ***actualisation***. Following are some examples of how the school has operationalised major concerns to prepare the ground for students' actualisation amid the pandemic.

i) Honing students' self-management and resilience skills

A theme talk on positive psychology was held to boost students' self-management and resilience skills, which

把一些主要關注工作付諸實行的例子。

i) 鍛鑄學生的自我管理和抗逆能力

書院舉辦了一次正向心理學專題講座，以提高同學的自我管理能力和抗逆能力，這兩者都是應對疫情下各種不明朗因素所必須具備的基本素質。配合同學的發展需要，高年級的講題為「Re-orientation —— 定位更新」，低年級的講題則為「Exploration —— 展翅」。由於教育局發出了保持社交距離和避免人群聚集的指引，為了讓全體同學都能參加專題講座，書院邀請了一位現職臨床心理學家的校友錄製一段 40 分鐘的影片，在 2020 年 10 月的班主任課播放給所有同學收看。該次講座啟發同學思考生命的正向價值，並讓同學認識如何處理（尤其在疫情之中）各種不利於適應的思維。專題講座後，由班主任帶領同學進行互動環節，增進彼此的溝通和了解。在疫情中各項維持社交距離的措施下，人與人之間的社交連繫就更顯珍貴。

ii) 協助學生盡展多元潛能，俾能卓絕群倫

近年加納 (Howard Gardner) 提出的多元智能理論得到了更廣泛的傳播，教育局資優教育組和多間學校均有採用。我們相信同學們都是獨一無二的，每種智能的表現程度可能各有強弱。我們的目標是幫助同學發掘並發展自己的興趣和才能，因此書院提供各種聯課活動供同學選擇，從中實踐上述理念。每年聯課活動報名日，各項聯課活動的執委成員會設置攤位，向同學宣傳所屬組織，而同學會在當日報名參加心儀的學會 / 組織。各項聯課活動的執委成員盡情發揮創意，採用不同宣傳策略，致力招募成員。聯課活動日是書院每年一度的盛事，為大多數 —— 甚至可能是全部 —— 同學提供了***確立抱負、整裝待發、付諸實行***的機會。

2020-21年度實體聯課活動報名日被取消，以網上報名活動代替。聯課活動執委成員運用虛擬宣傳代替傳統的宣傳攤位，又創作宣傳短片，上載到書院內聯網。同學在網上報名期內可先觀看短片，然後報名參加不同的聯課組織。各委員運用了多種媒介製作宣傳短片，包括動畫、馬賽克、資訊圖表、藝術文字等。同學們的適應能力和創意，令我們印象深刻。

各項聯課組織的定期集會和活動，也透過實時會議應用程式在網上進行。轉以網上形式進行集會時，我們更加強調個別聯課活動的「情意」和「認知」元素，而涉及實體訓練的聯課活動則暫停舉行。透過網上集會，組員間培養起團隊精神和歸屬感，同時也學到相應的知識和技能。

are essential qualities that students should possess to handle uncertainties under the pandemic. To cater for students' developmental needs, the theme 'Re-orientation —— 定位更新 ' was chosen for the senior forms while 'Exploration —— 展翅 ' was chosen as the theme for the junior forms. To make this theme talk available for all students while observing EDB's guidelines on social distancing and prohibition of mass gathering, an alumnus who is a clinical psychologist was invited to record a 40-minute video, which was then played to all students during the class teacher period in October 2020. Our students were enlightened with the positive values of life and were equipped with the skills to deal with maladaptive thoughts, especially during the pandemic. Students had interactive sessions with their class teachers after the talk to facilitate mutual communication and understanding, as social bonding is exceptionally valuable when all sorts of social distancing policies are in effect.

ii) Supporting students with diverse talents to excel in their areas of interest

The Theory of Multiple Intelligences proposed by Howard Gardner has been more widely publicised in recent years and is adopted by the Gifted Education Section of EDB and various schools. We believe students are unique and the degree of performance in each intelligence may vary. It is our aim to help students discover and develop their own interests and talents. Such belief is operationalised by the diverse choices of CCA. On the CCA Enrolment Day every academic year, committee members of various CCA groups will set up booths to promote their groups to their fellow schoolmates. Students will enrol in CCA groups of their choice on this day. Committee members of CCA groups will exercise their creativity, adopt various promotional strategies, and try their very best in recruiting members for the groups. The CCA Enrolment Day is a once-in-a-year occasion which provides most students, if not all, with a combination of opportunities to ***aspire, articulate***, *and* ***actualise.***

The 2020-21 CCA Enrolment Day was cancelled and CCA Online Enrolment was conducted instead. CCA groups committee members replaced their traditional booth promotion with a virtual promotion. Promotional videos were created and uploaded to the school intranet. Students watched the videos before enrolling in various CCA groups during the online enrolment period. These promotional videos were created using various tools, including animations, mosaic, infographic, word arts, etc. We are impressed by the students' adaptability and creativity.

Regular CCA meetings and activities are also conducted online via real-time meeting apps. The 'affective' and 'cognitive' components of individual CCAs are emphasised at online meetings, while those involving physical trainings are suspended. Team building and sense of belonging are nurtured among group members and some corresponding knowledge and skills are also delivered to students via the CCA online meetings.

iii) 培養學生關心國家及世界事務，並擁有世界公民意識

我們為同學提供充分機會，把學習範圍擴展到課堂以外，並培養他們的國民身分認同和世界公民意識。書院每年都會接待來自不同國家的國際交流計劃 (AFS) 交流生，他們積極參與校內活動，大大豐富了書院的文化氣氛。過去十多年，書院舉辦過不同主題的遊學團，藉以拓闊同學的視野，培養他們的國民意識和全球公民意識。因應疫情帶來的轉變，我們必須改用虛擬方式，與內地姊妹學校及外國夥伴書院學校進行交流。2019 年 12 月，我們與維也納商學院進行了首次虛擬交流。另外，本校中四及中五的文化交流大使正策劃一項與廣東廣雅中學進行的虛擬交流計劃，已於 2021 上半年推行。當我們致力幫助同學在這「新常態」下持續並有更多學習時，當中每一小步都是舉足輕重的

文章原載於 2021年 2月的《資優洞見》

iii) Nurturing students' global citizenship and awareness of national and global issues

Ample opportunities have been given to our students to extend their learning beyond the classroom and nurture their national identity and global citizenship. The school hosts American Field Service (AFS) exchange students from foreign countries every year and their active participation in school activities has enriched the cultural ambience. For more than a decade, learning tours with diverse themes have been organised to broaden students' horizon and nurture their national identity as well as global citizenship. In response to the pandemic, we have to explore virtual exchange with our sister school in Mainland China and our partner schools in other foreign countries. In December 2019, we held our first virtual exchange with Vienna Business School. Our F.4 and F.5 cultural exchange ambassadors would also hold a virtual exchange programme with Guangdong Guangya High School to be launched in the first half of 2021. Every little step counts when we are working to sustain and enrich students' learning in this 'New Normal'.

This article is stemmed from 'GE Insights' February 2021

逆境・平靜
Serenity

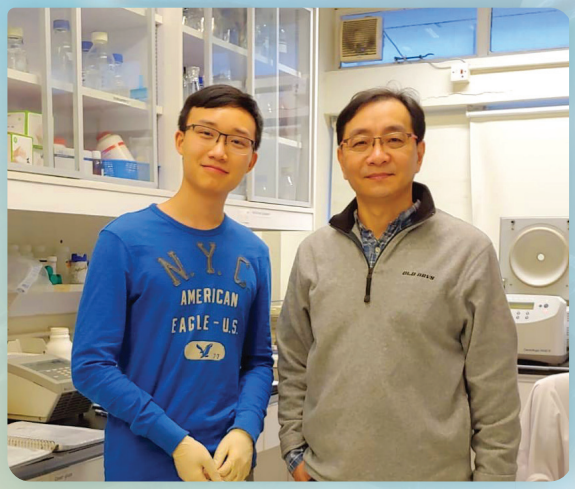
黃摯毅 熱愛腦神經科學
Genper Wong Passionate about Neuroscience

對於文憑試 (DSE) 的學生來說，去年真是非比尋常的一年。考生懷著忐忑不安的心情備戰公開試，其中包括三位曾代表香港參加 2019 年「國際生物奧林匹克」比賽獲獎的資優學員，他們分別是黃摯毅、周景毅和覃業晉。三位熱愛生物科學的少年，經此一疫上了成長的一課，最終順利升讀他們心儀的學科。

黃摯毅喜歡探求學問，傳授知識，夢想成為教授，將來從事教育工作。摯毅雖然年青力壯，喜歡運動和行山，但他表示去年疫情爆發之初，曾擔心家人和自己受到感染。他擔心在這非常時期內，會因為染疫而被隔離，有機會影響考試；長遠來說，肺功能或會變差，影響健康。與其終日憂慮，個性温暖的摯毅從積極的角度看逆境，發揮正能量，自製搓手液保護經常要接待客人的媽媽，同時把搓手液送贈給需要外出購物的外傭姐姐，還有媽媽的同事。

Last year was an extremely exceptional year for those who took the DSE examination. Students prepared for public examinations with an apprehensive mind, including the three award-winning gifted students who had attended the International Biology Olympiad 2019, namely Genper Wong, Nick Chow and Bruce Chum. The pandemic has brought a life lesson to these three young biology enthusiasts who finally enrolled on their favourite programmes.

Genper Wong likes to delve deep into the intellectual world and aspires to be a professor in tertiary education. Since the outbreak of COVID-19, he was worried about his family and his own health. This strong and healthy young man who loves sports and hiking was concerned that his examination would be affected if he had got infected and isolated. In addition, there might be complications such as reduced lung function in the long term even after recovery. Instead of worrying day and night over this, Genper chose to respond to the challenges with a positive attitude by producing some homemade hand sanitisers for his mother who



摯毅攝於實驗室
Genper in the laboratory

回顧去年疫情中考公開試，摯毅覺得最重要是保持冷靜。停課不停學的日子，正是培養自學能力的契機。公開試的壓力可不少，他表示持續温習，效率反而下降，故此會做其他事來平衡一下。對腦神經學尤其著迷的他，創立網上頻道 (HK Brain Bee)，分享及研究腦部分子細胞的課題。他根據腦部運作的形式，為自己度身訂造作息時間表，分時段專注温習不同學科，適時休息、替學生補習、閱讀小說、為自創腦神經比賽頻道編寫教材等。

在疫情中應考公開試，摯毅覺得好「 正 」！原因是在小小的課室考試更加温馨，而因為要保持社交距離，考試期間縱然不小心掉了筆，亦不會影響到旁邊的考生。經此一「逆」，摯毅更加體會凡事以平常心待之，疫下考試，的確提心吊膽，但人生往後仍有許多場考驗在等著你！

摯毅最終如願以償以 7 科 5** 的亮麗成績，入讀中文大學主修細胞及分子生物學。他醉心實驗，天天往實驗室裏跑，研究人腦，廢寢忘食。他說研究不像背書有固定答案，研究帶引他探索未知事物，前人未涉足過的領域。儘管有時候實驗中未必找到假設的結果，甚至有時連實驗也做不成，但能夠勇敢誠實地面對未知事物，不斷在未知的領域之上，加多一點點，再加多一點點，解決問題，呈現真相，對此摯毅感覺刺激和興奮！

frequently greeted guests. This caring gift was also offered to his domestic helper and his mother's colleagues.

Looking back on his DSE exam strategy, Genper believed that the most essential strategy was to keep calm. In the days of 'suspending classes without suspending learning', it was a valuable chance for him to enhance his self-studying skills. Knowing that learning efficiency would be diminished as studying time lengthened, he did something different to relax his mind from stress. This neuroscience-lover created a channel called HK Brain Bee to share his research on this topic. By applying his knowledge on the operation of the brain, he tailor-made a study schedule by allotting specific timeslots for different subjects, breaks, tutoring, reading novels, writing teaching materials for neuroscience competitions, etc.

To Genper, it was fantastic taking exams in pandemic times as the small rooms used for examinations offered him a sense of cosiness. Due to the social distancing rules, no one would notice and be affected even when a pen was dropped on the floor. Genper felt panicked during the exam in pandemic times, but he grasped the importance of maintaining peace of mind which could walk him through many more challenges ahead.

Genper finally got flying colours at DSE, attaining 5** in seven subjects which led him to the Cell and Molecular Biology Programme at the Chinese University of Hong Kong. He enjoyed going to the laboratory and studying the human brain restlessly. He is fascinated by doing research that offers no fixed answers and he could explore untrodden paths and domains. Though there are times he failed to prove the hypothesis or even to conduct any laboratory experiments, Genper felt excited and encouraged when he could face up the uncertainties with courage and learn new knowledge in an unknown area bit by bit to resolve problems and dig out truths.

逆境·自律
Discipline

周景毅（左一）
Nick Chow (first left)

周景毅 醉心醫學研究
Nick Chow Enthusiastic in Medical Research

周景毅的夢想是成為研究員。他對科學研究的興趣始於「國際生物奧林匹克」比賽，在比賽訓練期間，有教授向他介紹研究過程並展示研究設施，令他感到興奮不已，立下投身科學研究的宏願。「我當時不太明白他們所說的是甚麼，但也可以感受到科學發現帶來的滿足。」

去年，遇上世紀疫症，作為學生的他可以儘量減少外出，但媽媽是護士，必須到風險相對地較高的醫院工作。景毅坦言當時擔心媽媽會受到感染，感恩至今依然平安。對科學感興趣的他認為疫情是生活化的教材，新冠疫情促使他更關心時事，他很想了解疫症的傳播途徑、病毒的基因排序、到底用甚麼藥物進行治療，以及思考如何減低染病的風險等。

Nick Chow's dream is to become a researcher. His interest in scientific research can be traced back to the International Biology Olympiad (IBO) training he received during which he was thrilled when he was first introduced to the research process and facilities by the instructors. Since then, he has aspired to be engaged in scientific research. He said, 'Though I couldn't fully understand what they said, I could feel the satisfaction brought about by scientific discovery.'

Last year when the pandemic hit the city, Nick, being a student, was able to avoid going out. His mother, however, as a nurse, had to work in the hospital, a relatively high-risk place. Nick admitted that he had been worried about his mother for exposing to the risk and was thankful that she has been staying healthy all along. Nick the science enthusiast said the pandemic had taught him invaluable lessons in real life. He has become more interested in current affairs because of this pandemic and would like to find

在預備公開試期間，景毅表示在疫情影響下少了外出，反而讓他有更多時間溫習。他認為珍惜時間至為重要，不要浪費了在家學習的日子。為了達到目標，他需要自律地學習，除了溫習課本內容，他亦會看相關的錄像，加深自己對某些知識的印象。面對 DSE，他採用了努力「操卷」的策略，讓自己熟習評分準則；同時平衡作息時間，期望可發揮最佳表現。在他眼裏，DSE 只是人生的其中一次考試，以平常心面對。他的減壓方法是在家做運動例如舉啞鈴和俯卧撐，還有聽古典樂，特別是後浪漫派的古典樂。

景毅最終以優秀成績獲中大取錄成為醫學院學生，與黃摯毅成為校友。他希望在疫情過後能與摯毅成為室友，一起研究科學，延續他們在「國際生物奧林匹克」結下的緣分。以往，媽媽時有向他分享照顧病人的點滴，現在成為醫科學生的景毅，希望在基因及腦神經科學進行研究，透過醫療護理幫助別人，治癒患者，減輕他們的痛苦。

out more about how the pandemic spread, the genetic sequencing of the virus, the medications for the pandemic, and ways to reduce the risk of being infected.

Spending less time outside to avoid getting infected had left Nick more time to prepare for the public exams. He considered that time management was of paramount importance and would not waste any study time when staying at home. In order to achieve his goals, Nick had to discipline himself to study. Besides going through the textbooks, he also watched related videos for a better understanding of the subjects. His strategies to prepare for the DSE included doing lots of past papers to get familiar with the marking schemes and maintaining a balanced daily schedule for study and rest in order to stay fit for the best performance. To Nick, the DSE was only one of the many challenges in life, and hence should be faced with an easy mind. Nick's tips for stress management included doing exercises at home, such as dumbbell-lifting and push-up, and listening to classical music, particularly post-romantic classical music.

With his excellent results in the public exams, Nick was admitted to the Faculty of Medicine of The Chinese University of Hong Kong, the same university as Genper Wong's. He hoped that after the pandemic, Genper and he could become hall mates and continue the fellowship they have established since the IBO training by exploring science together. During the past years, Nick's mother has been sharing with him how she took care of patients. Now as a medical student, Nick aspires to conduct research in genetics and neuroscience in the future, with a view to supporting and healing people through medical care that could relieve the patients' suffering.

逆境·感恩
Gratitude

覃業晉 愛上免疫學
Bruce Chum Fascinated by Immunology

覃業晉的夢想同樣與研究有關，疫情未出現以前，他已對免疫系統特別感興趣。他說人體內的免疫系統活像一場戰爭遊戲，由勢均力敵的免疫細胞與病毒對壘，光是觀察它們如何對打，已樂上半天。回望去年疫情下考公開試，有得亦有失。他不諱言去年疫情期間停課令他失去了參加模擬考試 (mock exam) 的機會，未能以校內成績報讀部分美國大學，令前赴海外升學的計劃遇到「阻滯」。再加上無法上學，跟同學見面相處的時間少了，畢業禮泡湯，令他難免感到失落。但疫情讓他有更多時間温習，而

Bruce Chum shares a similar research dream with his IBO teammates. Even before the pandemic, he has already been very keen on immunology, thinking that the immune system was like a war game where the immune cells and viruses of equal strength fought with each other. Merely observing the fight would be a genuine amusement to Bruce. When looking back on how he prepared for the public exams during the pandemic, Bruce recalled both pains and gains along the way. Due to the suspension of school activities last year, he was deprived of the opportunity to take the school's mock exam and get a result slip to apply to study in certain universities in the US. Besides, the suspension prevented him from meeting his classmates frequently and also led to the cancellation of the graduation

覃業晉（右）
Bruce Chum (right)

他所屬中學的整體成績亦有所提升，令人鼓舞！

面對疫症，業晉能跳出個人的困局，進而思考疫情對家人和其他國家帶來的影響，眼界和心境也隨之豁然開闊。他曾為父母的生計擔心，但感恩至今家庭的經濟沒有受到影響。他對應屆 DSE 學生表示同情，「他們去年就讀中五時已失去了學習時間，及至升上中六因為疫情反覆，亦較少時間返校上課，相比之下，我那一屆的學生，其實已算不幸之中的大幸。」

此外，從宏觀角度，作為世界公民，他表示疫症若發生在第三世界國家，後果或會更加嚴重。果然其後印度的疫情失控，令國民苦不堪言。去年疫情爆發，他希望各國能夠早日研發出疫苗，讓疫情受到控制。而年半過後，疫苗果真面世，各國人士亦紛紛開始接種。

去年，業晉獲港大生物系取錄展開他的大學生涯。他喜見摯毅和景毅可以在實驗室內追尋他們的研究夢，也希望自己可以盡快接觸科學研究。為此，權衡授課模式、修讀學科的靈活性，還有於業界實踐所學的機會，業晉決定於今年九月轉赴英國曼徹斯特大學修讀心儀的免疫學。祝願他在科研路上學有所成，心靈得到滿足，滿載而歸！

ceremony. He admitted that he was once disappointed and lost. However, the pandemic had also given him more time to study, and he was excited to find the overall academic performance of his school had improved during the period.

Under the pandemic, when Bruce shifted his focus from his own difficulties to the impact of the pandemic on his family and people in other countries, his vision was subsequently opened up and his mood lifted. Though once being worried about his parents' jobs, Bruce was pleased that the financial situation of his family had not been affected. To students taking DSE this year, Bruce was sympathetic towards them. 'They had already missed some study time in S5. After their promotion to S6, the pandemic situation fluctuated, and they were further deprived of the time for face-to-face learning. Their situation was indeed harder than us who graduated a year before.'

As a global citizen, Bruce also opined from the macro perspective that if the pandemic broke out in a third world country, the implications would be even worse. This was later seen in the outbreak in India under which the whole country suffered. At the beginning of the outbreak last year, Bruce wished vaccines would soon be developed in various countries so that the pandemic spread could be put under control. Eighteen months later, vaccines were rolled out and people in different countries started to get vaccinated.

Bruce was admitted by the School of Biological Sciences of the University of Hong Kong last year. He was thrilled to see Genper and Nick pursue their research dream in the laboratory, and was eager to start his own research work. Having considered various factors including the programme delivery mode, the flexibility in course selection and the opportunities for putting the acquired knowledge into practice, Bruce decided to travel to the UK this September to study immunology at the University of Manchester. We wish him all the best in his research career and study life in the UK!

疫境中的祝福(一)

Blessings in The Pandemic (Part 1)

新冠肺炎在全球蔓延，歐美確診個案時有起伏。部分留學生回港避疫，但亦有部分決定留在當地，繼續他們的研究生涯，當中包括學苑的校友。

While COVID-19 continues to spread across the globe, confirmed cases in Europe and the US rise and fall. Some overseas students have returned to Hong Kong, while others have decided to stay overseas to continue with their studies, including alumni of the HKAGE.

譚博文 Tam Pok Man

從二維空間到壯麗銀河

From The Two-dimensional Space to Magnificent Galaxy

現年二十五歲的譚博文為美國賓夕凡尼亞大學物理系博士生，研究在二維物理世界裡，透過電子之間的相互作用，造就何種奇異的物質狀態。他憶述去年三月中起，費城居民開始感到惶恐，食肆只接受外賣，非必要業務例如書店均暫停營業，城市運作逐漸停頓，而當時他亦暫別校園，開始在家進行研究工作。由於口罩短缺，加上戴口罩會受到歧視，博文表示會盡量留在家中，只是人流密集的地方例如超市才敢戴上口罩。為了保護自己，他會用消毒紙巾包裹購物籃的把手。及至去年的 4 至 5 月，大部分美國人亦開始恆常地在公眾場所佩載口罩，一起抗疫。

疫情以來讓博文印象深刻的是去年美國物理學會三月會議。活動開幕前兩天緊急煞停，使他喪失參加這個原本雲集全球一萬二千人的物理界盛事的機會。博文惟有把準備好的分享片段上載 YouTube。可轉念一想，博文打趣地說，「為期五天的會議幸好沒有舉

Tam Pok Man is a 25-year-old PhD candidate in physics at the University of Pennsylvania. Pok Man's research is about exotic phases in the world of two-dimensional materials, where electrons are strongly interacting. He remembered when the lockdown first started, people in Philadelphia were enveloped in fear, eateries only accepted takeaways, non-essential shops such as bookstores were closed, the whole city gradually came to a standstill. He also started working from home away from campus. Due to the shortage of face masks and the discrimination against people wearing face masks, Pok Man stayed home as much as possible. He scarcely dared to wear face masks except in crowded places like supermarkets. He would use sanitising wipes to wrap around the handles of shopping baskets to protect himself. From April / May last year, most Americans began to wear masks regularly in public places to fight the pandemic together.

The most unforgettable experience he had during the pandemic was the cancellation of the American Physical Society (APS) March Meeting, which was announced just two days before the opening, when he was just about to attend the event. Since he was not able to present his work before the other 12,000 conference

辦，否則或會成為全球最大的交流想法與病毒的場所。」經過了年半有多，疫情較為受到控制，今年的美國物理學會三月會議在網上舉行，儘管不能到美國另一個城市參加實體會議，但對於首次參加這項物理界盛事的博文，能夠參加不同學者的網上分享活動，穿梭於知性宴饗，雖疲勞，但感覺豐富而滿足，期待明年可參加實體會議。

回顧過去年半，儘管疫情對全球帶來重大衝擊，對於熱愛研究的他影響不大，博文說，「由起初不太適應到適應了在家研究，從很有興致在家煮食到有點厭倦下廚。及至疫情緩和，大學重開，重返校園專心研究，可以再次平衡工作與作息時間。這段日子最難忘的是封城之後，不可過著正常的城市生活，於是開始跟室友探索大自然。斯時，室友購入一部私家車，於是他們駕駛超過 7 小時車程，帶備露營用品，造訪美國東部最黑暗的櫻桃泉州立公園 (Cherry Springs State Park) 觀星去。」喜愛在香港行山的博文，從未見過如此壯麗的銀河系，感受浩瀚宇宙的震撼！

博文原先為 2020 年美國物理學會三月會議（因為疫情取消）預備的分享片段
Pok Man's sharing prepared for the APS March Meeting (cancelled due to the pandemic)

delegates, Pok Man resorted to upload his presentation via his YouTube channel. In hindsight, he said, 'Fortunately this 5-day conference did not take place, otherwise it could have become the biggest platform for virus exchange, alongside with the exchange in concepts and ideas. After more than one and a half year, the pandemic is now relatively under control. This year the American Physical Society conducted the March Meeting online. Though Pok Man could not travel to another city for a face-to-face conference, he was able to attend the online presentations of many different scholars. As a first-time delegate of such an important conference, Pok Man, though tired, felt satisfied and fulfilled in joining this intellectual feast, and he looked forward to joining a face-to-face meeting next year.

Looking back on the past 1.5 years, the pandemic had not much effect on Pok Man's research, despite the global impacts the pandemic had brought along. He commented, 'I went from feeling uneasy to getting accustomed to working from home, and from being passionate about home cooking to getting fed up with that. Now that the pandemic has eased off, university campus has reopened, and we can return to campus to focus on our research, thus striking a balance between work and rest. The most unforgettable thing during the lockdown was that we could no longer enjoy urban life. I started to explore nature with my flatmate who had just bought a car. We brought along camping materials and drove over 7 hours to Cherry Springs State Park, the darkest park in the East of the US, for star gazing.' Pok Man has always enjoyed hiking in Hong Kong, yet it was only on that trip that he saw with his eyes the magnificent galaxy and experienced the amazing greatness of the universe.

疫境中的祝福(二)

Blessings in The Pandemic (Part 2)

曾嘉鏵 Tsang Ka Wa

幸福「發夢家」

The Blessed Dreamer

現年二十九歲的曾嘉鏵為荷蘭國家亞原子物理研究所博士生和研究員，居於海牙附近。經過四年奮鬥，嘉鏵完成了有關重力波的研究，於今年三月獲荷蘭格羅寧根大學頒發博士學位。儘管疫情反覆，敢於造夢的嘉鏵依然能闖過一個又一個的難關，在疫情期間開發了「發夢家」頻道，以幽默諧趣的形式分享科學知識，邀請大家和他一起發夢。

在這年半的疫情，嘉鏵與太太經歷忐忑不安的日子，從去年初口罩昂貴，由初時需要寄口罩給香港的家人，到後期荷蘭口罩短缺反過來要受人接濟。再加上荷蘭設有禁蒙面法，想佩戴口罩防疫，真的阻力重重，既要面對旁人的目光，又可能被指引起社會恐慌。嘉鏵憶述，「有一次巴士司機甚至不讓我們戴口罩上巴士。」在荷蘭政府亦有推出「安心出行」，同樣沒有強制下載。當系統偵查到過往兩周內曾接觸過確診者的人士，就會建議他們進行檢測。而他的太太亦曾收到通知，幸好檢測結果為陰性。

疫情高峰時，餐飲業只能外賣，晚上有宵禁令，必須證明自己有工作在身，或是需要放狗才能外出。在荷蘭，

Tsang Ka Wa, aged 29, is a PhD candidate and researcher at the Dutch National Institute for Subatomic Physics (Nikhef). He is currently residing near Hague. After four years' hard work, Ka Wa completed his research on gravitational waves and earned a PhD degree by the University of Groningen in March this year. Amid the pandemic, Ka Wa the daring dreamer has overcome hurdles one after another and has created a hilarious YouTube channel 'The Dreamer' to share scientific knowledge with his audience and invite them to dream with him.

During the past 18 months of the pandemic, Ka Wa and his wife went through lots of unsettling moments. At the outset of the pandemic when there was an upsurge in the price of facial masks, they helped their family members in Hong Kong by sending them less expensive face masks. However, when the Netherlands began to run short of face masks later, they needed to rely on others to send them face masks from aboard. With the 'burqa ban' that prohibits people from concealing their faces in public areas, people wearing masks for preventing infection might encounter challenges, including the disapproving gaze of passers-by and others' accusation for causing social panic. 'A bus driver even refused to let us get on the bus with our face masks on,' Ka Wa recalled. The Dutch government has also launched a non-compulsory contact-tracing app, similar to the 'LeaveHomeSafe' Mobile App in Hong Kong. If one is detected to have been in contact with any confirmed cases, he/she will be recommended to take the virus test. His wife once received such a recommendation

由於醫療系統不堪負荷，縱使病毒測試呈陽性，亦無法到醫院治理，只可留家休養，啟動自癒能力，許多人也覺辛苦。尤幸，目前已有改變，戴口罩已成了新常態。

工作文化方面，荷蘭人注重身心平衡，在研究所工作的日子，所屬機構的舉措相當窩心，每隔個多月便會送上載有食物、紅酒、運動用品等的禮物籃，為員工打氣。最令人感動的是為了讓員工可以舒舒服服的在家工作，研究所甚至可以把員工平日在機構使用的座椅送到他們家中。惟一令嘉鏵有些微灰心的是，曾花上半年時間才找到工作。

嘉鏵從一家規模較小的石油公司，經五次面試，轉到一家在歐美上市的半導體設備製造商 ASML 負責數據科學工作，生活水平得以提升。疫情是大環境，人在外地，不無壓力。生活中夾雜著各種瑣事，煮食清潔，家居維修，原來家政和金工木工，是眾多學科最管用的科目！當嘉鏵安靜下來沉澱思想，反思自己從一個甚麼也不曉的小子，移民海外，於彼邦落地生根，肩負起整個家庭的責任。看著自己擁有的一切，覺得自己好幸福，許多事也值得感恩，生活小小挫敗，實在微不足道！

and fortunately got a negative result.

At the peak of the pandemic, only takeaways were available at restaurants. Curfews were put in place and only people who could prove their needs to perform certain tasks or to walk their dogs were allowed to go out. The healthcare system in the Netherlands was once so overloaded that even people who had tested positive could not gain access to hospital treatment but could only stay home for self-recovery instead. People there did go through some hard time. Now the situation has changed and wearing face masks has become a new normal.

Regarding the workplace culture, the Dutch emphasise much on work-life balance. The research institute in which Ka Wa conducted his research was very considerate and heart-warming. Gift hampers containing food, red wine, sporting accessories etc. were sent to employees every one or two months to lift their spirits when they were working from home during the pandemic. The research institute even offered to deliver employees' own office chairs to their door so that they could work comfortably from home. The only thing that had worried Ka Wa a bit was the job search that had last for almost half a year.

After five rounds of interviews, Ka Wa successfully changed his job from working in a small petroleum company to working with the current employer ASML, a leading manufacturer in the semi-conductor industry listed in Europe and the US. He is now engaged in data science work and the change has brought along a rise in their overall living standard. The pandemic has set a panoramic scene for everyone under the sun and staying abroad will surely add to the pressure one experiences. When facing with different house chores, cooking, and cleaning works, home maintenance tasks, etc., one might find that the most practical subjects to learn under the pandemic should be Domestic Science, Metalwork and Woodwork! Sitting down and quietly reflecting on what he has gone through as an innocent youngster moving to a foreign country and growing up to a man who is now shouldering a new family with all he has accomplished; Ka Wa is filled with gratitude. Though life has some setbacks occasionally, they are nothing compared to the blessings Ka Wa receives.

嘉鏵在疫情期間製作的廣東話科普 YouTube 頻道「發夢家」
Cantonese YouTube channel 'The Dreamer', created by Ka Wa during the pandemic for popularisation of science knowledge

資優教育變陣迎挑戰(一)

教學篇

新冠肺炎持續，本港不同界別均受到衝擊，資優教育亦不例外。去年，自教育局宣布「停課不停學」，作為提供資優教育課程的機構，學苑亦即時變陣迎接挑戰。

過往，每年學苑均有派學員赴海外參加國際賽事或學術文化之旅，讓他們的資優潛質得以發揮。受到疫情影響，海外活動不是取消就是延期。至於面授課程，則即時轉為網上課程。

學苑課程分為兩類，由外聘導師或由學苑同工負責。疫情蔓延，同工與導師商議，把面授課程轉為網上課程，部分在大學任教的導師熟習網上教學模式，很快已可以串流直播；惟部分導師沒有網上教學經驗，同工唯有與他們一起探索，摸著石頭過河，自學網上教學，重新設計課程，一些原先由互動活動展開的課程，須改為直接進入課程內容；同時需要通知家長、學員網上課程的安排，及如何進入網上平台上課。換了網上教學，突破了地域限制，可幸的是部分滯留在內地省份的學員，因封城無法返港上課，反可參加網上課程。

而由同工帶領的課程，同樣需要重新設計，既要兼顧課程內容，更要掌握資訊科技，熟習網上會議、講座及教學的竅門，因為以前未做過，工作量較以前增多。有同工懷著戰競的心情在網上教學路上探索，有同工展開新奇大發現，赫然發現多種網上教學平台、不同的軟件可供使用，但同時需要克服應用科技上的各種難題。

在家工作，如同進行「實驗教學」一樣，同工要同一時間內利用桌面電腦、手提電腦和手提電話，並且邀約其他同事模擬網上教學。在教學內容上，探索更多軟件功能和教學策略，例如：播放短片、繪畫、文字雲、小測驗、即場投票、分組等等，令課堂變得精簡兼具趣味。

同工表示起步時的確是未預備好，但隨著時日增長，運作得愈來愈純熟，相信網上課程可與面授課程互補，與學員一起創造更靈活多變的學習空間。學苑希望將來有機會跟學界交流網上教學經驗，希望教育局可為同工安排相關培訓。

Gifted Education: Swift Responses to Unprecedented Challenges (Part 1) —Teaching

In the face of the COVID-19 pandemic last year, gifted education was among those sectors that bore the brunt. Since the Education Bureau announced the 'Suspending Classes without Suspending Learning' policy, the HKAGE as a provider of gifted education has swiftly adopted various changes to rise to the challenge.

The HKAGE has been sending student members to overseas study tours or international tournaments every school year to help unleash their potential. In the wake of the pandemic, the overseas activities were either cancelled or postponed. All face-to-face classes were switched to online delivery instantly.

The programmes offered by the HKAGE are either delivered by service providers or by the Academy's programme officers (POs). Upon discussion with the service providers following the COVID outbreak, it was decided that the face-to-face programmes would be shifted to online delivery. Some service providers who had been teaching in universities and were familiar with online teaching quickly adapted to the new mode and live streamed their classes on e-platforms. Other service providers, however, did not have any online teaching experience and needed the POs' support in learning the required techniques and in redesigning the teaching materials. Some programmes originally started with interactive ice-breaking activities were modified with these activities being taken away. Under the new delivery mode, the HKAGE also needed to keep parents and students informed of the online teaching arrangements and the related technical details. Fortunately, the switch to online delivery has facilitated the connection with students stranded on the Mainland who would otherwise not be able to join the classes in Hong Kong due to travel restrictions.

Programmes delivered by POs also needed revamping. Apart from preparing the teaching materials, the POs expended efforts to explore the latest technologies and related delivery tips for conducting online seminars, webinars, and classes. The workload increased significantly with the switch to the new delivery mode. During their adventurous journey of online teaching, the POs explored the new domain with trembles and fears and discovered a great variety of online teaching platforms and software readily available for use. At the same time, they needed to tackle with the related technological challenges.

Switching to work from home was like undertaking 'experimental teaching'. The POs had to use the desktop computer, notebook computer and mobile phones at the same time. They also invited their teammates to test run the online teaching. By exploring and applying different software and methodologies for online teaching, such as the use of video clips, drawing tools, word cloud, quiz, instant poll, breakout rooms, etc., they made the classes as packed and engaging as they could.

The POs admitted that they were not fully prepared for online teaching at the start of the pandemic spread. As time has gone by, however, the operation has become smoother and smoother. We believe that online teaching and face-to-face teaching are complementary to each other and the two together will create a more flexible and creative learning platform for students. It is hoped that the HKAGE could exchange its online teaching ideas with other educators and that necessary training in this regard would be provided by the Education Bureau.

資優教育變陣迎挑戰(二)

學習篇

承上文，學苑在疫情衝擊下變陣，把面授課程轉為網上課程，改變了教學模式，滿足資優學生在停課期間熱切追求知識的內在需要，今回繼續談學員的學習感受。

自從去年復活節左右，有學員慨嘆學校停課已持續一段時間，失去了校園生活；假若學苑的資優課程也停頓下來，真的倍感失落。事實上，疫情以來，部分海外比賽、交流活動不是延期就是取消。尤幸，學苑大部分課程和活動仍可以網上形式延續下去，包括國際比賽訓練課程、學員籌委會會議，還有首次舉辦的網上頒獎禮暨學生論壇，為恆常活動注入新鮮感和另類元素，做到「停課不停學」。

從面授改為網上課程，學員很快便適應下來。他們表示網上課程的優點是足不出戶也可上課，不怕受到病毒感染。有說，在上課之前已收到導師的筆記，可以在事前預習，更明白課程內容。有說，在課堂上投票，按鍵即可，保有個人私隱，如果不想說話又可把咪關上。還有突破地域限制，住在較為偏遠地區如元朗者，也可通過網上平台上課；其次是可以減省舟車時間，讓學員在作息方面安排得更好，能平衡學業與增潤式學習的需要。

然而，網上活動亦有缺點。以網上會議為例，有說遇上不少困難：有人忘記開會或爽約不參與會議，又有學員因為不理解會議記錄而誤會原先計劃內容，要花上較多時間解釋，才能重入正題。部分學員在課堂上關掉鏡頭，令大家感到很生疏，仿似跟「隱形人」一起上課，溝通受到阻隔。有時又會遇上技術問題，網絡不夠穩定，出現「Lag 機」的情況，也試過在會議進行期間互聯網斷線，影響學習果效。

總的來說，學員較為喜歡參加面授課程，因為能與導師及其他學員面對面盡情地討論，不明白可以即時發問，看到對方的反應，通過身體語言，更能明白對方，促進彼此之間的溝通。但亦有學員對設立網上課程表示歡迎，其中有百分之三十左右的學員希望面授與網上課程並存。他們認為網上課程靈活而具彈性，即使在考試期間亦可兼顧學苑的學習進度；納悶之時，又可以選擇參加面授課程，回到學苑跟大家見面。

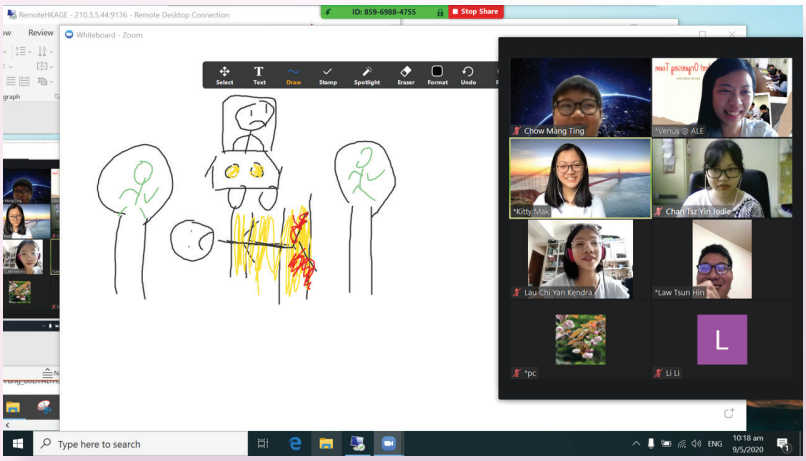
Gifted Education: Swift Responses to Unprecedented Challenges (Part 2)

— Learning

As mentioned in the previous article, the HKAGE made the swift response to switch its face-to-face programmes to online delivery in the face of the COVID-19 pandemic to satisfy the gifted students' intrinsic need to pursue knowledge during class suspension. In this article, our gifted students will share with us their feelings.

Around Easter last year, some student members started complaining that they were deprived of their school life due to the extended class suspension. If the programmes offered by the HKAGE should also be suspended, their feeling of loss would be even more intense. In fact, overseas competitions and exchange events organised by the HKAGE had been either cancelled or postponed since the pandemic outbreak. Fortunately, the delivery of most of the HKAGE's student programmes and activities, including training for international competitions, meetings of the Student Organising Team, as well as the first-ever online award presentation ceremony cum forum, were able to continue online. Online delivery injected fresh elements into the regular programmes while helping us achieve the objective of 'suspending classes without suspending learning'.

Students adapted quickly to the switch from face-to-face to online learning, saying that one of the advantages of learning online was the lower risk of contracting the virus by staying home. Some students commented that as the course materials were sent to them before each class, they could prepare for the class and have a better grasp of the course content. Some mentioned that online polls conducted in class were anonymous in nature and could help protect their privacy. Students could also choose to mute themselves when they do not want to speak up. The fact that online courses could help remove the geographical barrier was another big plus. Students living in remote districts such as Yuen Long could easily join the class through an online platform. Online courses also saved them time from commuting long distances, thus allowing for optimum use of their time as they tried to strike a balance between school assignments and the Academy's enrichment programmes.



Online activities have their shortcomings, too. Taking online meetings as an example, issues reported ranged from participants missing the appointments to mis-interpretation of meeting materials and hence the content of the project under discussion, thus requiring greater efforts in clarification before the discussion could start. Some students did not turn on their cameras, creating barriers in communication when they seemed to be invisible. There were also technical issues, such as computer lagging due to network instability or even internet disconnections, which altogether affected the learning experience.

In general, students preferred face-to-face learning to online learning, because they could discuss freely with instructors and peer students and could ask questions immediately if they encountered problems. Students could also observe others' responses and have a better understanding of them through body gestures to enhance communication. Some students commented that the online and face-to-face delivery modes are complementary to each other. Around 30% of the student members welcomed the combination of online and face-to-face teaching, which would allow for maximum flexibility as students could attend the HKAGE programmes even during the school exam period, while having the choice to enrol in face-to-face classes to meet their peers when they become bored being alone.

新常態：線上教學 各出奇謀

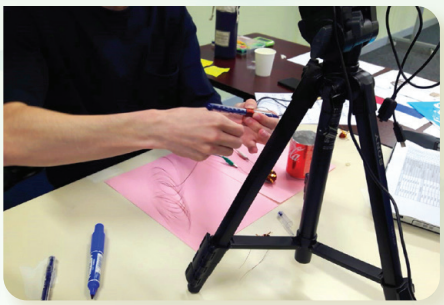
為了應對反覆的疫情，各國各地各出奇謀，在美國的「全國新冠期間戶外教學計劃」建議把室內課堂移師戶外，他們牽頭組織工作小組，制定全國性的戶外學習框架、策略和指引，讓學童在戶外空間相對安全地復課。在丹麥，為了減低社交接觸的風險，政府下令預留社區公園作幼童上學之用。此外，酒店、銀行、會展中心、博物館及圖書館等均可備用作為上課用途。但香港地少人稠，相對地難以實行。

儘管受到土地空間的限制，但只要心態轉變，創意就能釋放，馳騁於廣闊的心靈空間。自二零一六年起，學苑與科大資優教育發展中心及教育大學合辦**「Thinking Like a Scientist – Project Eureka」科學思維啟蒙計劃**，透過探究式學習，提升小學生的科學素養。去年八月，學苑的小學學員在科大及教大的學生帶領下，探索聲與電的科學原理。負責統籌的大學生指出，他們原先計劃透過面授課程進行科學實驗，故此一等再等，盼疫情放緩才推出活動。但經多番考量和掙扎，最終突破固有思考模式，改於線上進行教學，效果出乎意料地好，學員能完成實驗，享受探索知識的過程。

究竟採用線上教學模式，小學生是如何進行實驗的呢？負責此項活動的導師發揮創意，採取符合現實的策略，於線上指導學生進行實驗：一、構思生活化實驗，讓學員DIY 製作喇叭，探索聲與電的原理；二、克服遙距學習障礙，郵寄實驗材料給學生；三、縮短課時，原先三小時的工作坊，分拆為兩節個半小時的活動，讓學員能夠集中精神學習；四、調整師生比例，由原先兩位導師教三十六名學員，改為四位導師，每位負責教九名學員。在新的教學安排下，其中一位導師兼任助教，協助支援各組個別學員的進度；五、遇到困難時，導師會先透過鏡頭了解學生的情況，嘗試指示學生解決問題，必要時才請家長即場支援學生。

當時有份參與是次計劃的其中一位大學生徐鑰因已投身教育界成為中學教師，負責任教中一及中二綜合科學。她表示很感恩可以成為教師。由於是新手教師，所以仍有很多地方需要摸索。可幸的是在學苑得到的線上教學經驗能讓她應用在學校的教學。在只能在家遙距學習的日子，校方曾著同學回校領取包含了實驗材料的小包裹，其後在線上課堂實時進行測試酸鹼度、抽取香蕉基因(DNA) 等實驗，讓同學從動手做實驗的過程中掌握課本中的知識。

Diverse Teaching Strategies for the New Normal

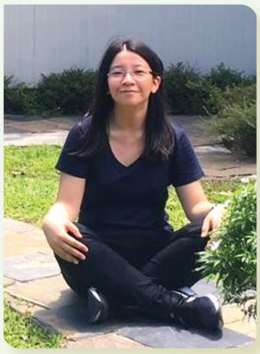


Various countries have put forth different strategies to work around the unstable conditions brought about by the pandemic. For instance, the National COVID-19 Outdoor Learning Initiative in the US suggested having classes outdoor. A task force was set up to formulate frameworks, strategies, and guidelines on outdoor learning so that students can resume classes relatively safely in an outdoor space. In Denmark, the government reserved community parks for the purpose of teaching kids in order to minimise risks in social contact. In addition, places such as hotels, banks, conference centres, museums, and libraries can be used for teaching purposes. This can hardly be achieved in Hong Kong due to the lack of space.

Though limited by space, we can still unleash students' creative potential by changing our mindset to let their imagination fly high. The HKAGE has been co-organising the **'Thinking Like a Scientist – Project Eureka'** with The Center for the Development of the Gifted and Talented (CDGT) in The Hong Kong University of Science and Technology (HKUST) and The Education University of Hong Kong (EdUHK) since 2016 to nurture the scientific literacy of primary school students through inquiry-based learning. Last August, our primary school student members explored the scientific principles of sound and electricity under the guidance of the students from HKUST and EdUHK. The undergraduate instructors pointed out that their original plan was to postpone the face-to-face scientific experiments to a later time when the pandemic had eased. Upon thorough consideration, an online version of the workshop was launched instead and was unexpectedly well received. Student members were able to complete the experiments and enjoyed the process throughout.

How did primary school student members conduct experiments under the online learning mode? The workshop instructors adopted the following strategies to guide students through the learning process: 1) to design experiments applicable in their everyday lives, such as allowing student members to design mini loudspeakers based on the scientific principles of sound and electricity; 2) to overcome the challenges of distance learning by mailing experiment materials to student members; 3) to shorten the lesson duration by breaking down a 3-hour workshop into two 1.5-hour sessions; 4) to adjust the student-teacher ratio by arranging 4 instructors to take care of 9 students each, instead of 2 instructors looking after a total of 36 students. Under this new teaching arrangement, one of the instructors also acts as a teaching assistant to follow up the progress of individual students in each group; 5) to understand the students' situation through the video camera and provide instructions when students encountered difficulties. Parents' on-site support would only be sought if necessary.

Kiara, who took part in Project Eureka last year as an undergraduate student, has become a secondary school S1-S2 Integrated Science teacher. She is grateful that she can join the teaching profession. As a beginner teacher, Kiara knows that there are areas in which she needs to explore. Fortunately, she can apply the experiences of online teaching at the HKAGE to her new workplace. During the times of learning from home when face-to-face classes were suspended, the school she is now working with gave out experiment materials for students' use in online real-time lab sessions for experiments like pH tests and DNA extraction from bananas. With the hands-on experiments, students were able to consolidate the knowledge they had learnt from the textbooks.



徐鑰因 Kiara Tsui

首屆2019/20香港資優教育學苑傑出學員頒獎禮

The First-ever HKAGE Outstanding Student Award Ceremony 2019/20

為了表揚具傑出表現的資優學員和校友，首屆2019/20香港資優教育學苑傑出學員頒獎禮已於2020年12月4日圓滿舉行。頒獎禮上除了向七名學員頒發「傑出學員獎」之外，亦頒發了「傑出學生獎」、「特別表揚獎」和「傑出校友獎」。

The first-ever HKAGE Outstanding Student Award Ceremony 2019/20 organised to show appreciation to gifted students and alumni with outstanding performances successfully concluded on 4 December 2020. Besides presenting the 'Gifted Star Awards' to seven student members, the 'Outstanding Student Awards', the 'Outstanding Alumnus Award' and the 'Honourable Mention for Alumnus' were also presented at the ceremony.

傑出學員獎 Gifted Star Awards

	姓名 Name	自2019年9月至2020年8月的卓越成就 Top Achievements (September 2019 to August 2020)
1	鄭逸朗，中五 Cheng Yat Long, S5	2019 國際初中科學奧林匹克香港隊（金牌） IJSO 2019 Hong Kong Team (Gold)
2	鄧皓文，中五 Tang Ho Man, S5	2019 國際初中科學奧林匹克香港隊（金牌） IJSO 2019 Hong Kong Team (Gold)
3	梁譽曦，中六 Leung Harris, S6	2019國際大都會奧林匹克香港隊 資訊科技組（金牌） IOM 2019 Hong Kong Team (Informatics) (Gold)
4	劉思進，十一班 Lau Sze Chun, Grade 11	2019國際大都會奧林匹克香港隊 物理組（銀牌） IOM 2019 Hong Kong Team (Physics) (Silver) * *以14歲之齡獲英國牛津大學無條件取錄修讀物理學* *Obtained an unconditional offer from Oxford University to study Physics at the age of 14*
5	Parul Methi，中五 Parul Methi, S5	在香港資優師徒計劃2018/20完成關於 STEM 教育的研究論文，並在2020年亞太國際學校會議發表 Completed a research paper on STEM education as her Hong Kong Gifted Apprentice Programme 2018/20 project with the paper presented at the Asia-Pacific International Schools Conference 2020
6	潘宏澔，中二 Pun Wan Ho, S2	香港模擬聯合國會議2020最佳演講獎 Best Speaker Award, Hong Kong Model United Nations Conference 2020
7	莫天恩，中四 Mok Tin Yan, S4	香港模擬聯合國會議2020優異獎 Honourable Mention, Hong Kong Model United Nations Conference 2020

傑出學生獎 Outstanding Student Award

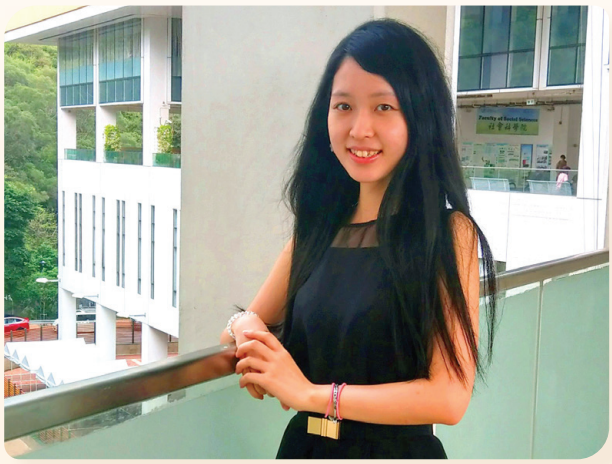
已升讀香港科技大學的李智滔同學曾是活躍學員，他同時是學生籌委會的委員，積極為學員策劃不同類型的活動。

Mr Lee Chi To, Ugo, has started his study at the Hong Kong University of Science and Technology. He was an active student member and a member of the Student Organising Committee. He proactively planned different types of activities for student members.

傑出學生獎 Outstanding Student Award

已升讀英國牛津大學的劉渙星同學醉心物理，過去參加的物理及其他學科課程逾 90 多個。他分享學苑的學習機會如何讓他發展夢想。

Mr Lau Woon Sing has started his tertiary study at Oxford University. He is a physics lover who has attended over 90 physics programmes and courses of other disciplines in the HKAGE. He shared how the learning opportunities of the HKAGE had facilitated him to pursue his dream.



特別表揚獎 Honourable Mention for Alumnus

駱美君女士已展開在金融領域的風險和法規管理職涯，但仍毋忘初心積極投入學苑事務，自 2017 年至今，一直擔任學苑的學術課程發展委員會委員，並為學員籌組多項活動。

Ms Lok Mei Kwan, Tracy, has already started her career in risk and compliance management in the financial sector. She has organised many activities for student members and has been sitting in the HKAGE's Academic Programme Development Committee since 2017.

傑出校友獎 Outstanding Alumnus Award

盧安迪先生現正在美國史丹福大學修讀經濟學博士及法學博士課程。他曾獲國際數學奧林匹克及國際物理奧林匹克多枚獎章。他更擔任導師，訓練香港國際數學奧林匹克代表隊成員。此外，他亦撰寫了許多具洞見的文章和書籍。

Mr Andy Loo is now studying PhD in Economics and JD in Law at the Stanford University of the USA. He has received several medals from the International Mathematical Olympiad (IMO) and the International Physics Olympiad. As an IMO trainer, he provides valuable guidance to the Hong Kong IMO team juniors. Furthermore, he has published numerous insightful articles and books.

何駿謙
Ho Chun Him

發揮創意 化想像為實際

Put Your Imagination into Practice

在科技發展蓬勃的社會，單靠認知層面的提升不足以應付社會急促的發展步伐，我們需要培養學生的二十一世紀技能，當中創意與想像力尤為重要。

資優學生創意無限，想法新奇有趣，有時更是天馬行空。但是，我們亦需要為他們制定一套框架，幫助他們學習如何釋放創意，整合天馬行空的想法，把它呈現出來，化想像為實際。

針對以上需要，賽馬會「知情達意育優才計劃」設計了「創意訓練工作坊」，以「創意4P」為框架，分別從人 (Person)、產品 (Product)、歷程 (Process) 及環境 (Press) 幾方面培育資優學生的創意，於課堂實踐所學，提升自信。

一) 人 (Person) —— 學員會了解創意者具備的特質，並透過互相分享，認識不同資優學生擁有的創意特質。此外，導師亦會強調自發的重要性，鼓勵學生自發表達創意理念，將創意呈現，製作創意產品。

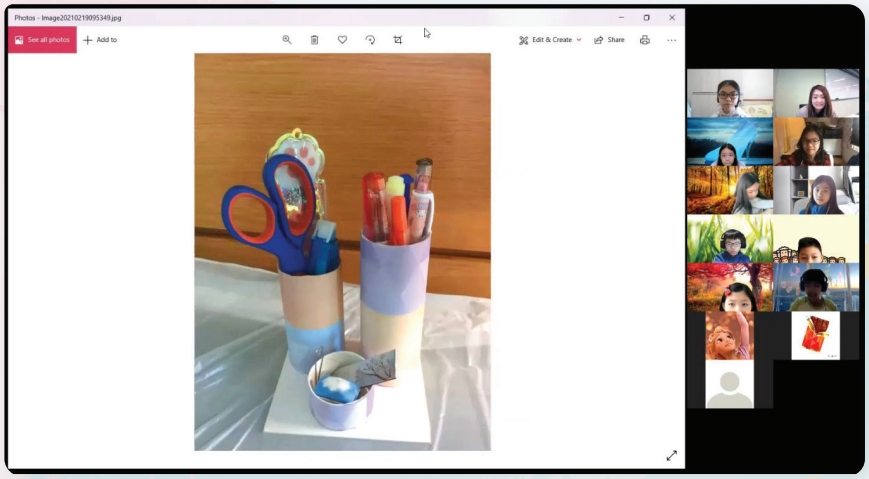
二) 產品 (Product) —— 創意產品除包含創新意念外，實用性亦是一個重要因素。故此，工作坊要求學員製

In a technologically advanced society, enhanced cognitive awareness alone is not enough for one to catch up with the rapid pace of development. Students need to be equipped with 21st century skills, among which creativity and imagination are of paramount importance.

Well known for their boundless imagination and innovation, gifted students like thinking out of the box. It is important that we set out a framework within which they can unleash their creativity and at the same time have their imagination put into practice.

In this connection, a creative training workshop named 'Be a Creative Student' was designed under the Jockey Club 'Gifted in Bloom – Harmony in Heart & Mind' Programme. It aimed to nurture our gifted students' creativity using the 4Ps of Creativity as the framework – Person, Product, Process and Press. In the workshop, participants tried to put their knowledge into practice and build up their confidence during the process.

1) Person — Students learned about the characteristics of innovators and understood the creative characteristics of different gifted students through mutual sharing. The importance of self-initiative was emphasised and participants were encouraged to take the initiative to present their creative ideas and turn these ideas into creative products.



「創意訓練工作坊」網上課程
'Be a Creative Student – Workshop'

作一件日常創意 (Everyday Creativity) 作品，當中涉及運用日常生活資源，加上創新想法，製成簡單又實用的物品改善日常生活。此類創作不限於課堂，亦可將之融入日常生活，培養創意習慣。

三) 歷程 (Process) —— 要培育資優生的創意可以鼓勵他們多角度思考，當中明辨性思考 (Critical Thinking) 是不可或缺的元素。學員於工作坊中學到六何法、六頂帽子思考法及**正面、負面、有趣點 (Plus Minus Interesting, PMI)** 分析法。透過不同的活動，讓學員明白到單一事件可以從多角度思考，加強個人創意。

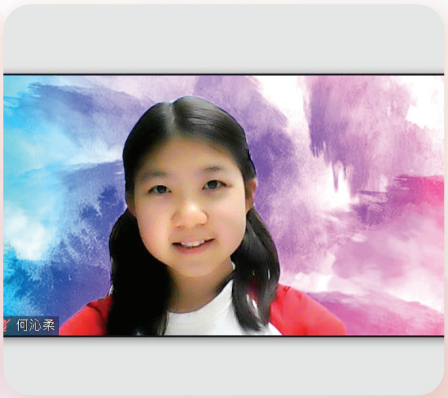
四) 環境 (Press) —— 為資優學生提供一個支持、正面，可以互相學習的環境，告訴他們創作無分對錯，鼓勵他們創作，勇於嘗試，發揮創意，體驗正面的學習經歷後，成為一個更富創意的資優學生。

2) Product — Apart from being innovative, creative products should also be of practical use. Therefore, students were required to produce a simple and practical 'Everyday Creativity' product, from everyday resources with a creative touch, to improve their daily living. Similar creativity exercises could be done in real daily life settings outside the classroom to build up students' creative thinking habits.

3) Process — One way to enhance students' creativity is to encourage their multi-perspective thinking. A critical thinking mindset is indispensable in this regard. In the workshop, students learned various thinking methods such as the 6Ws, the 6 Thinking Hats, and **the PMI (Plus Minus Interesting) analysis method**. Through the activities in the workshop, students learned that a single issue could be viewed from different perspectives, and this would help enhance their creativity.

4) Press — A positive and supportive environment facilitating mutual learning was provided for the students. By emphasising that there is no right or wrong in any creative work, we encouraged the gifted students to make bold attempts to unleash their creativity. With the positive learning experience gained in the workshop, the students would become even more creative.

快速收納包
Quick storage bag



何沁柔 Ho Sum Yau Koey

科學、機遇與挑戰
新興科技講座系列

在過去數個世紀，我們見證科技進步對社會經濟發展帶來巨大的影響。在創新科技的助力下，人們的生產力和生活水平得到極大提升，但亦同時喚起了人們對健康和環境可持續發展的關注。

自2019年7月起，香港資優教育學苑與香港青年科學院舉辦了一系列講座，讓中學生和教師能夠一窺最尖端的新興科技如何影響我們的日常生活。講座旨在讓聽眾掌握一些必須具備的知識，為迎接未來的機遇和挑戰作好準備。講座涵蓋廣泛的主題：「重塑生命密碼」、「從量子計算到能源收集」、「深度學習及其應用」、「本地專家就2019冠狀病毒疾病最新情況的探討」、「科技救地球」、「從宇宙到世界」等。

本系列講座原先構思為大型講座形式，並設有互動答問環節。然而，在疫情期間，大部分講座改以網上形式進行。尤幸，與會者依然對講座充滿興趣和熱情。部分學生更參加了多個講座，提出一些超乎想像、發人深省的問題。許多學生認為講座的質素甚高，內容具深度，令他們獲益良多。學生學習的課題，諸如量子工程、基因組編輯、人工智能和再生能源等，都遠遠超出常規課程的範圍，令他們對許多科學和技術領域的前沿發展嘖嘖稱奇！

這系列講座激發學生思考，提高他們對科學的興趣，增強他們的科學探究能力，推動他們進一步探求知識。一位學生就有關遺傳學的講座分享他的看法：「動植物的基因(DNA) 編輯仍然有許多具爭議性的問題需要我們探索思考。這些問題都相當有趣，透過講座，讓我了解到更多有關DNA 編輯對人類身體的影響。」另一位學生發現講座能幫助他追尋夢想，他說：「我希望成為天文學家，而這個講座糾正了我對天文學的錯誤觀念，更激發了我更深入地認識宇宙。」

教師也是本系列講座的對象。大部分教師表示於講座獲得的知識能促進他們的教學表現，而講者分享的創新意念和資源，透視STEM 的未來方向，啟發他們重新設計教學材料。他們表示得到了新穎的先驅知識，期望再次參加相類似的講座。

講座又為學生和演講嘉賓提供創建思想交流平台。與會者對講座內容甚感興趣並提出各種深入的問題。演講嘉賓對參加者極富創意的問題留下深刻印象，並享受與他們交流。

若各位希望參加即將舉行的「科學、機遇與挑戰 — 新興科技講座系列」活動，可瀏覽以下網址：https://www.hkage.org.hk/b5/talk

Talk Series on Emerging Technologies —

Science, Opportunities, and Challenges

In the past few centuries, we have been witnessing the enormous impacts of advancements in science and technology on the socio-economic developments of our society. Assisted by the innovative technologies, the productivity and the living standard of people have risen tremendously. At the same time, however, become more aware and concerned about health issues and the sustainability of our environment.

The Hong Kong Academy for Gifted Education and The Hong Kong Young Academy of Sciences have co-organised a series of talks since July 2019 to enable our secondary school students and teachers to have a glimpse of how the latest emerging technologies are impacting our daily lives. These talks equipped the audience with the essential knowledge and insights to face the opportunities and challenges ahead. The diverse scope covered extensive topics: *Nature's Red Pencil: Writing and Rewriting Genomes; From Quantum Computation to Energy Harvesting; Deep Learning and Its Applications; Update on COVID-19 from Expert Local Scientists; Saving Our Planet with Science and Technology; From Cosmos to Us, etc*.

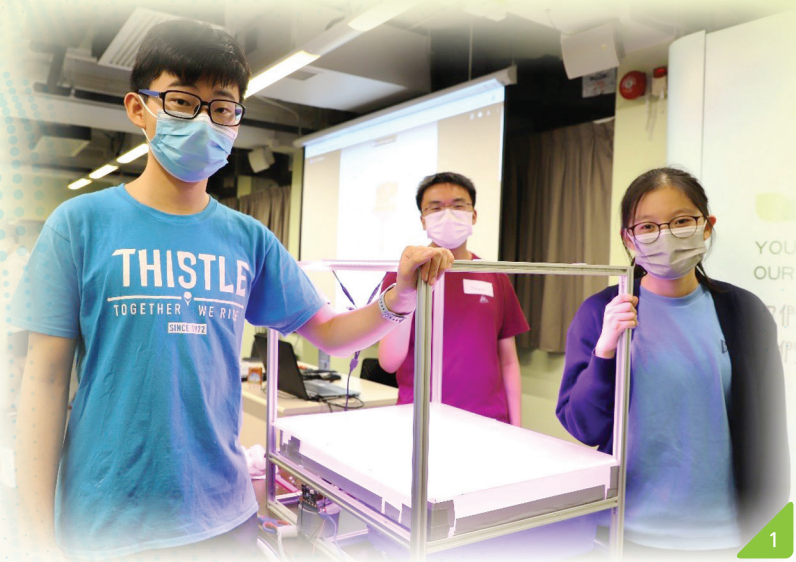
The talk series was originally conducted as mass lectures with interactive Q&A in between. However, under the pandemic, most of the talks were turned into online modes. Yet, this has not undermined the participants' interests and enthusiasm. Some students attended multiple talks and raised a lot of good questions that were beyond our expectations. Many students opined that the talks were of high quality and it was very rewarding to join them. Students learned on topics such as quantum engineering, genome editing, AI, and renewable energy which are well beyond the regular curriculum. They were astonished by the advanced movement in many areas of science and technology.

The talks inspired student's thinking, raised their interest in science, strengthened their scientific inquiry skills, and motivated them to pursue further. A student commented on a talk about genetics that 'the DNA editing on plants and animals has raised many controversial questions for us to think about. Those questions are interesting, and I have learned more about the impact of DNA editing on human bodies.' Another student who found the talks helpful in pursuing his dream said, 'I have a dream of becoming an astronomer, and the talk has cleared up much of my misconceptions in astronomy and inspired me to learn more about the universe.'

Teachers were also one of the targets of this talk series. Most of them expressed that the knowledge gained from the talks was beneficial to their teaching. They could get novel ideas and resources from the speakers to re-design their teaching materials with an insight into the future STEM movement. They claimed that they were able to update themselves on the pioneer knowledge and wish to participate in similar talks again.

The talks also helped create a platform for students and the speakers to exchange ideas. Many participants asked in-depth questions with keen interest. The speakers were impressed by the creative questions from the participants and enjoyed interacting with them.

If you would like to participate in upcoming activities in the Talk Series on Emerging Technologies — Science, Opportunities and Challenges, please visit the following link for details: https://www.hkage.org.hk/en/talk



1

大想法：城市農耕創客培訓課程

背景

「大想法：城市農耕創客培訓課程」通過產品設計和製作，提升學員構思新穎點子和解決問題的能力。在參加此課程前，學員須先報讀「城市農耕先修工作坊」，並有出色表現，繼而進行更深入的學習。

在先修工作坊和創客培訓課程中，學員更加意識到本地和全球城市農耕的重要性，例如了解到香港目前的長遠發展策略《香港2030+》，在於探討推廣康樂及社區農耕對可持續發展所起的作用，既能夠滿足香港當前和未來社會、環境和經濟需要，同時又認識到糧食危機這項全球性問題，學員可以就此倡導可行的解決方案。

於課程內，學員可以親自動手，運用金屬架、水泵和micro: bit微型電腦控制器，設計和建造水耕種植的原型，從而學習透過專案策劃、執行、評估和反思，實踐自己的構想。他們必須通過自我主導的體驗式學習，尋求並應用創客知識，加深對環境議題的共鳴。

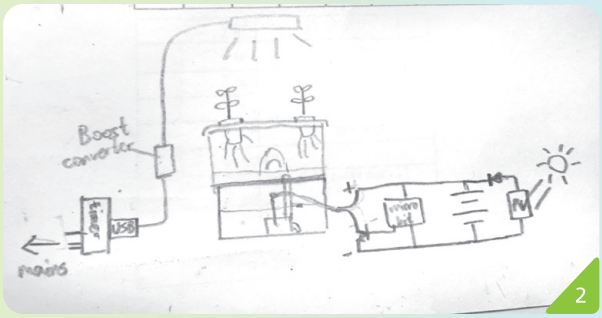
根據我們的觀察，林傲天是其中一位積極參與課程的學生。他熱愛學習，經常提前到達上課地點，下課後仍續鑽研捨不得離去。傲天試過在一節課上花上逾兩個多小時來設計並構築其團隊的水耕種植原型。

作者：林傲天　　圖片：林傲天

對課程的反思

我有機會跟兩位隊友設計並建造一個水耕培植系統。經過反複測試，最終成功建立了系統。儘管製成品並不完美，仍有不同缺陷，例如滲水和電線鬆脫，但在若干程度上總算能夠運作。

課程結束，我們告別的不僅僅是一個課程，而是一次觸動我的學習之旅。能夠與隊友一起製成水耕系統原型，是一次非常有得著的經歷。然而我想，若沒有使用原型來種植農作物，整個課程還算不上功德完滿。但是，由於無法把原型帶走進行改良、優化，我覺得有點沮喪。因此，我渴望在家中做一個迷你版系統，繼續改良我們的原型，並嘗試用來種植薄荷，測試它的實力。



2

在課程結束三個月之後，我終於種出了兩株近一英呎高的薄荷，還長出了花朵。最初，我打算用種出來的薄荷製作甜品，但上網查看後發現我所種植的是「貓薄荷」，味道辛辣而非香甜，不適合用來製作甜品（我也嚐過幾片貓薄荷葉，味道的確如此）。

雖然我栽種的並非想要種的薄荷品種，但當我看到自己的水耕薄荷以驚人速度生長，還可以用來製作草本茶和調味料，令我得既興奮又感動。在此過程中，我獲得了許多有關水耕的知識，包括需要多頻繁地浸潤植床、葉子和根部需要多少空間成長…… 等等。我還學會在栽種植物之前，必須確保所種下的是想要選的品種。

最終，我能夠成功地用自己設計的水耕系統種植農作物，這種經驗和嘗試帶來的成就感，實在令人鼓舞。看看那些紫色的花兒，不是蠻漂亮嗎？

1. 傲天和他的隊友在學苑設計並建造的水耕系統原型（左起：林傲天、王力霆、陳映言）The prototype that Gideon and his teammates designed and constructed in the HKAGE (From the left: Gideon Lam, Thomas Wong, Valerie Tanya Chan)
2. 迷你版智能水耕系統的設計圖
The system diagram of the mini grower
3. 薄荷植物和水培種植器的全貌
Full view of the mint plants and the hydroponic grower
4. 薄荷花，一張圖片勝過千言萬語
Flowers of mint. A picture is worth a thousand words.

BIG IDEAS:
Urban Farming Maker Programme


3

Background

The BIG IDEAS: Urban Farming Maker Programme aimed to enhance students' idea generation and problem-solving skills through product design and making. Prior to joining this programme for more advanced learning, students were required to complete a preliminary urban farming workshop with exceptional performance.

Through the preliminary workshop and the maker programme, students became more aware of the importance of urban farming both locally and globally. They were introduced to Hong Kong 2030+, the long-term development strategy, with a view to meeting Hong Kong's present and future social, environmental, and economic needs. They also learnt about the food crisis, another global issue, and were encouraged to initiate some possible solutions.

During the programme, students had fully 'hands-on' experiences in designing and constructing hydroponic grower prototypes by using metal frames, water pumps, and micro: bit. They learnt how to put their ideas into practice through project planning, action, evaluation, and reflection. They had to pursue, apply maker knowledge, and deepen their compassion on environmental issues through self-directed and experiential learning.

Gideon Lam, one of the active participants in this programme, was extremely fond of learning. He often arrived in advance for class and stayed behind after class. He once spent more than two hours in a session designing and constructing his team's prototype.

Author:
Lam Ngo Tin, Gideon

Photos:
Provided by Lam Ngo Tin, Gideon

Reflection on The Programme

I got a chance to design and build a hydroponic grower with my two teammates. After trial and error, we managed to build the grower at the end. It functioned to a certain degree, though it was not a perfect one. There were still various defects like water leakage and wires coming loose.

The leaving at the end of the programme was beyond just a programme. It was a rewarding experience as I managed to build the prototype with my teammates. To me, the programme could not be considered as completed without making the prototype work and growing crops with it. However, since we were not able to bring the prototype home and fix it, I did feel bad. Therefore, I was eager to continue to improve my prototype at home. In order to test the potential of our design, I built a mini version of the prototype for planting mint from seeds at home.

Finally, I cultivated two mint plants which blossomed into one foot tall and with flowers after the programme has been completed for three months. Initially, I planned to plant spearmint for homemade mint desserts. After investigating online, I discovered that the mint I grew was Faassen's catmint, with a pungent and grassy taste instead of a sweet, refreshing mint taste (I ate a few leaves of them, the taste was not pleasant).

Although I planted the wrong species of mint, I was deeply touched and felt excited when I saw the astonishing growth rate of my hydroponic mint and took the catmint for herbal tea making and dish seasoning. During the process, I gained a lot of knowledge in hydroponics, including how often the growing bed needed to be moisturised, how much space was required for the foliage and roots, etc. I also learned the need to ensure the correct species to be planted.

Ultimately, I managed to grow crops using a grower we designed, and I considered this experience and experiment a success. Look at the purple flowers, aren't they pretty?


4

大想法：城市農耕創客培訓課程
The BIG IDEAS: Urban Farming Maker Programme

1

師徒承傳：激發思想火花

作者：林永和醫生、譚凱因、鄧皓文

「香港資優師徒計劃」是學苑的標誌性計劃，自2017年至今，配對過數十對師徒，令不少學員獲得造就。是次邀得林永和醫生和他的徒弟凱因和皓文與我們分享參加計劃的感想。

林永和醫生

不少學校和機構均會籌辦「師友計劃」，希望可藉着導師的啟發和指導，協助學員在升學、就業及成長路上作好規劃，活出豐盛而快樂的人生。一般而言，計劃會先瞭解學員的興趣、能力、抱負及性格等，然後配對導師。坊間對醫生導師的需求殷切，所以歷年來每次獲邀作導師時，我都會接受。然而，跟學員的互動總是不太理想。遇上較被動的學員，大家可能沒見過面，只曾通過數次電郵或電話；嘗試過主動些，邀請學員定期面見及來診所作體驗，但總覺他們不太投入，經瞭解後才知道他們因為功課太忙，所以心不在焉；也有學員坦言志向未明，只是父母希望他做醫生，才參加計劃，難免缺乏熱誠。

兩年前，我參與由香港資優教育學苑主辦的「香港資優師徒計劃」，學苑為我配對的「徒弟」凱因是位聰明伶俐、誠懇有禮的高中生。汲取了過往當導師及自己教養兒女的教訓，我明白自己不可太心急、太直接，要先瞭解，建立默契和互信，才可有效地引導新一代。升學、選科及職志的取向固然重要，但更重要的是要培養正義、善良、仁愛、樂觀、積極和謙卑等素質，以及解難、管理壓力和待人接物等能力。

高中生與醫生都是大忙人，雖然見面的機會不多，但每次都很充實，平日則靠電話、訊息、分享文章和資訊來做聯繫。我們會輕鬆聊天，也會談及生活中的苦與樂；凱因訴說成長的點滴和疑難時，讓我可更深入地瞭解她，並嘗試找機會引領她成長。這年來，香港經歷各種變遷與苦難，只要她願意，我都會跟她討論，學習如何明辨是非，面對逆境。至於規劃將來，我讓她先作選擇，然後要商量或協助的話，我才稍作提點。她選擇行醫，我也認為適合，但仍提醒她，將來必有順逆，人生充滿變數，不怕後悔，凡事總有轉機，家人和我都會與你同行。兩年的計劃完成了！凱因的人生才剛開始，我為她送上無限祝福！希望作為家長的讀者，藉着參考我的歷程，更懂得如何引導兒女成長，做個更稱職的生命導師！

本文原載於《黃巴士 Light》第143期，內容略經修改

The Hong Kong Gifted Apprentice Programme: *Curiosity and Compassion Kindled*

Authors: Dr Edmund Lam, Daphne Tam and Thomas Tang

The Hong Kong Gifted Apprentice Programme (HKGAP) is a signature programme of the Academy. Since 2017, dozens of masters and apprentices have been matched and many apprentices have been benefited from the personal coaching offered by their master. This time, Dr Edmund Lam and his apprentices, Daphne and Thomas were invited to share their thoughts.

Dr Edmund Lam

Some schools and organisations offer mentorship programmes that focus on students ' further studies, career development and life planning. Students are matched with a mentor based on their interests, abilities, ambitions, personality and more. Doctors were sought-after so I often said yes whenever I was invited to be a mentor. However, interaction with mentees was not always pleasant. Passive students were only in contact with phone calls or emails. Some seemed reluctant to meet face to face or visit my clinic. They were disengaged due to busy schoolwork while others had no clear ambitions and only joined the programme under their parents' nudge.

Daphne, my mentee of the Hong Kong Gifted Apprentice Programme (HKGAP) organised by The Hong Kong Academy for Gifted Education (HKAGE), was smart and polite. With my participation in another mentorship programme and my guidance for my children. I have learnt to be more patient and circumspect from experience when it comes to communicating with youngsters. I must first understand her and develop a good rapport so that she would feel safe to share her troubles and accept advice. Sharing strategies for further studies, selection for the university major and development for career orientation are essential, but a mentorship should also instill righteousness, benevolence, optimism, humility and more, as well as skillsets to solve problems, manage pressure and cooperate.

High school students and doctors are both busy. Despite limited meetings with Daphne, we had a substantial discussion on phone calls, texting, and the sharing of articles to keep in touch on weekdays. Daphne shared difficulties and frustrations throughout her upbringing with me. I could then know her better and strive to support her growth. When Hong Kong slumped in turmoil, I would share my ethics and values if she wished to listen. I suggested she choose her heart's desire and I would always be happy to advise. Her choice of pursuing a medical profession seemed feasible. But I still reminded her to live without regrets and seize every opportunity to grow despite all uncertainties ahead. Her family and I will continue to support her. I wish her all the best and hope my experience may inspire parents to become good mentors throughout children's growth and development!

This article was adapted from a column published on the ***Yellow Bus Light Issue No.143***

1. 林永和醫生和他的兩位徒弟譚凱因、鄧皓文（自右至左）
Dr Edmund Lam with his two apprentices, Daphne and Thomas Tang (From right to left)

2

譚凱因

我十分感謝香港資優教育學苑給予了我一個寶貴的機會，讓我能夠參加第二屆師徒計劃，更令我認識到這一位充滿熱誠和無私的林醫生。

過去兩年來林醫生不斷給予我機會，讓我到他的診所體驗，令我獲益很多。林醫生不僅醫術精湛，而且細心又耐心地與病人同行，如同家人般扶持病人，令我很感動。他讓我明白到待人處事應抱有同理心，要以人為本，並切切實實為對方著想。除此之外，他更幫助我確立人生路上繼續努力和追求的方向。

除了協助我規劃人生目標，林醫生還一直在旁扮演著引導和陪伴的角色：當我在學習生活中感到沮喪時，他會透過分享親身經驗給予鼓勵和支持，更傳授自己讀書考試時的秘笈。當我對社會上發生的事感到困惑時，他亦會中肯和理性地與我交換意見，探討各方的觀點。

而林醫生亦對我性格的轉變有正面影響，最初的我可能有點陌生膽怯，但與林醫生交流下來發覺他平易近人。在他的鼓勵下，我亦日漸變得開朗自信，更嘗試鼓起勇氣主動踏出舒適區，樂於接受挑戰。這些溫暖的點點滴滴，我都會銘記在心、無比感激。

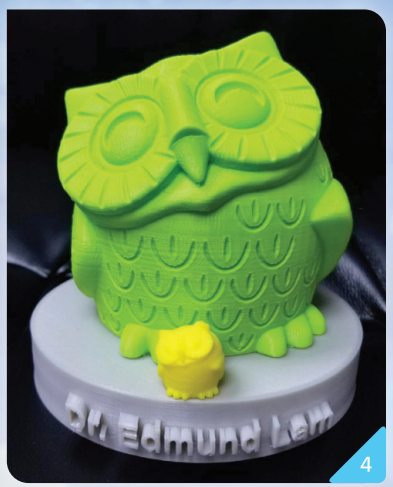
Daphne Tam

I am Daphne Tam, a mentee under the HKGAP – 2nd cohort. I am grateful to the Academy for giving me the opportunity to join this programme and to know Dr Edmund Lam, my enthusiastic and selfless mentor.

During the past two years, Dr Lam has been giving me plenty of opportunities by arranging experiential visits for me to his clinic, which has benefited me a lot. Dr Lam is not only exquisite in medical skills, but he also walks with his patients with circumspection and patience and supports them like a family member. I am profoundly touched by what he has done. I have learned from him that I should be empathetic in getting along with others and should put people first and take their needs into consideration. He has also helped me to establish the direction of my efforts and pursuit in life.

Apart from assisting me in planning my life goals, Dr Lam has been playing a guiding and accompanying role beside me. When I felt frustrated in my study, he would offer encouragement and support by sharing his personal experience, and even his secret tips for studying and taking exams. When I was confused about things happening in society, he would share his views rationally and discuss the issue with me from various perspectives.

Dr Lam has also affected me positively in my personality development. I felt unfamiliar with him at first and was a bit timid and shy. After we have communicated with each other, I found that Dr Lam was friendly and easy-going. With his encouragement, I gradually became more cheerful and confident and acquired the courage to step out of my comfort zone and face up challenges. I am very grateful for all these warm memories which I will forever cherish.



2. 2019香港資優師徒計劃年度聚會
HKGAP Annual Gathering 2019

3,4. 皓文製作了一份 3D 打印禮物，表達他對林醫生的感謝
A 3D printing gift was made by Thomas to show his appreciation to Dr Lam

鄧皓文

在資優師徒計劃下，我有幸成為林永和醫生的徒弟。在過去的一年裡，我緊隨林醫生在他的家庭醫學診所觀察，汲取成為良醫的寶貴經驗。

一般人的理念認為成為醫生，只需要死記硬背各種疾病的病理及作出準確的診斷。但實際卻大相逕庭，要成為一位成功的醫生，關鍵在於如何運用同理心，能與患者建立信任的關係。

在診所實習期間，我領會到一個好醫生應該需要關懷病人。林醫生以身作則，在他身上，我看到如何「傾聽」，怎樣「溝通」。因此，他能夠與患者建立互信和深厚的情誼，這種關係亦使患者的治療更加有效。曾經有一位七十五歲的老太太帶著一位老友從新界長途跋涉，跑到林醫生位於上環的診所求診。一開始時驚訝不已的我後來漸漸明白到信任的重要性。

林醫生的病人來自不同階層，包括街坊鄰里、工人、小孩子、青少年和長者等。他對所有患者的同理心給我留下深刻的印象。溝通、傾聽和同理心似乎是當今的流行術語，但說起來容易，做起來困難卻不少。這一年的體驗，提醒我要讓自己具備這些重要素質和技能，為將來成為一名醫生做好預備。

我很想藉此機會感謝林醫生成為我的師傅，帶領我在人生的道路上探索醫學領域。

Thomas Tang

Under the HKGAP, I was given a precious opportunity to become Dr Edmund Lam's apprentice. Throughout the past year, I have shadowed Dr Lam at his family clinic and learnt invaluable lessons about what it means to be a good doctor.

Contrary to popular belief, being a doctor is not solely about memorising facts about different diseases and making diagnoses accurately. Alternatively, sympathetic relations with the patients is the key to being a successful doctor.

During the clinical attachment, I learnt how a good doctor should take care of his patients. Dr Lam demonstrated the skills of 'listening' and 'communication'. Therefore, he could build up trust and solid bonds with his patients. This relationship makes the treatment of patients more effective. There once was a 75-year-old woman who brought an old friend from the New Territories to visit Dr Lam's clinic in Sheung Wan. I was surprised at the beginning, but later understood from this case the importance of trust.

Dr Lam's patients came from all walks of life, including residents nearby, workers, children, teenagers, the elderly, etc. Dr Lam's empathy towards all his patients really impressed me. Communication, listening, and empathy have become popular terms nowadays, but it is easier said than done. The shadowing experience served as a reminder for me to equip myself with these crucial qualities and skills, to prepare myself as a doctor.

I would like to take this opportunity to thank Dr Lam for taking me as his apprentice and leading me in the exploration of medicine on my journey of life.

以「元認知」促進資優生的自我調整學習

Promoting Gifted Students' Self-Regulated Learning with Metacognition

2020 年全球疫情大流行，各地大部分面授課程轉為網上進行。美國著名大學（如哈佛、普林斯頓、喬治城等）也準備開辦網上課程，應對這個全球現況 (Inside Higher Ed, 2020) 。由於缺乏老師及同學的直接支援，很多學生未必能有效地在家學習。他們可能缺乏維持自我調整學習的條件，如內在目標導向、時間及學習環境的管理能力、求助動機等 (Richard & Myron, 2004) 。

有鑑於此，香港資優教育學苑情意教育部於 2020 年 12 月 18 日舉辦了「自我調整學習：資優生的元認知」家長講座，由學苑臨床心理學家劉繼璋博士主講，旨在讓家長學會如何促進資優子女自我調整學習，以面對其學習上的困難。劉博士透過日常生活及學習例子，向家長講解認知心理學概念，包括認知、認知策略、元認知知識（自我策略任務知識）、元認知要求、元認知策略、動機策略、自我調整學習等。

有家長在講座裏詢問如何幫助其孩子促進學習表現，例如，一個孩子對科學著迷，也很積極學習，但其他比較不感興趣的事情就不想理會：不是做得不好，而是不想做。劉博士運用元認知知識向家長解釋孩子的反應是自然並可以理解的，他建議家長運用動機策略提高孩子進行其他較不感興趣但對其有益的學習活動動機。

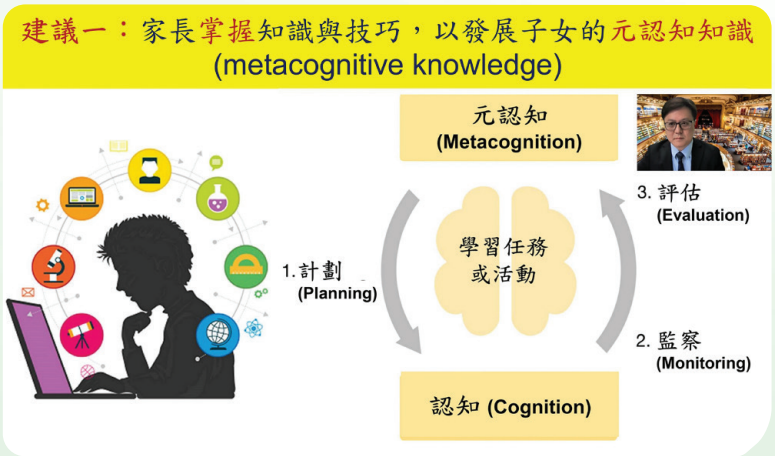
參考資料 Reference:

1. Inside Higher Ed. (2020). *COVID-19 roundup: more universities announce online plans*. Retrieved from https://www.insidehighered.com/news/2020/07/07/coronavirus-roundup-more-universities-announce-plans-largely-online-fall-terms
2. Richard, L., & Myron, D. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning*, 5(2), doi: 10.19173/irrodl.v5i2.189

Due to the global pandemic in 2020, most of the face-to-face courses have switched to online courses. Renowned American universities (such as Harvard, Princeton, Georgetown, etc.) are also preparing to commence online courses to address this global situation (Inside Higher Ed, 2020). Because of the possible absence of direct support from teachers and classmates, many students may be unable to study effectively at home, as they may lack certain conditions to maintain self-regulated learning, such as intrinsic goal orientation, time and learning environment management, help-seeking, etc. (Richard & Myron, 2004).

In response to this current situation, the Affective Education Division of the Hong Kong Academy for Gifted Education hosted a parent seminar on 'Self-Regulated Lear ning: Metacognition of Gifted Students' on 18 December, 2020, to equip parents with understanding on how to promote their gifted children's self-regulated learning to cope with difficulties in learning. It was lectured by Dr Richard Lau, a clinical psychologist of the Academy. Dr Lau explained to parents the basic and advanced concepts of cognitive psychology through daily life and learning examples, including cognition, cognitive strategy, metacognition, metacognitive knowledge (self-knowledge, strategic knowledge, task knowledge), metacognitive demands, metacognitive strategies, motivation strategies, self-regulated learning, etc. Dr Lau also explained that metacognition is the knowledge you have of your own cognitive processes, which can be used to enable students to achieve self-regulated learning.

A parent enquired about how to promote learning as her child was fascinated by science and was also very active in learning. Her child did not care about other things less interesting to him, and simply not wanting to do other things. Dr Lau used self-knowledge (metacognitive knowledge) to explain that the child's reactions were natural and understandable. He suggested the parent using the strategies mentioned in the seminar to improve the motivation of the child in other less interesting but beneficial learning activities.



劉博士向家長解釋如何透過元認知推動子女對學習活動作出計劃與監察，並對其活動的進度作出評估。
Dr Lau explained to parents how to promote their children's plan and monitor their learning tasks with metacognition and evaluate the progress of those tasks.

提名計劃
Nomination Scheme

適用於中小學「學校提名」及「自身提名」
Applicable to 'School Nomination' and 'Self Nomination' for Secondary and Primary Students

香港資優教育學苑（學苑）致力確保本港 10 至 18 歲的資優學生獲得合適的學習和發展機會。

學苑每學年主要透過「學校提名」及「自身提名」計劃取錄適齡學員。有意成為學苑學員的資優學生必須先以合格成績完成「第一階段：香港資優教育學苑網上甄選學習課程」，方可於「第二階段：遞交提名資料」接受進一步甄選。

每年學苑將安排一次可於該學年內完成的提名程序。有關詳情，請參閱以下網頁：https://www.hkage.org.hk/b5/students/student-membership

The Hong Kong Academy for Gifted Education (HKAGE) endeavours to secure appropriate learning and development opportunities for gifted students aged 10 to 18 in Hong Kong.

The HKAGE admits student members of appropriate ages mainly through the 'School Nomination' and 'Self Nomination' schemes every school year. Gifted students interested in being members of the HKAGE are required to pass 'Stage 1: HKAGE Online Learning Programmes for Screening' before they can submit their nomination profiles in 'Stage 2: Submit Nomination Profiles' for further screening.

One nomination will be arranged to be completed within a school year annually. For details, please visit the following website: https://www.hkage.org.hk/en/students/student-membership

2021/22 提名計劃時間表（暫定）
Nomination Scheme Timeline 2021/22 (Tentative)

第一階段：香港資優教育學苑網上甄選學習課程
Stage 1: HKAGE Online Learning Programmes for Screening

步驟一　簡介會：整體提名計劃安排
Step 1　Briefing Sessions: Overall Arrangements for the Nomination Scheme

2021年9月 • Sept 2021

步驟二　報讀任何一個香港資優教育學苑網上甄選學習課程
Step 2　Apply for any one of the HKAGE Online Learning Programmes for Screening

2021年9月至10月 • Sept to Oct 2021

步驟三　以合格成績完成香港資優教育學苑網上甄選學習課程，方可獲取提名資格
Step 3　Complete the HKAGE Online Learning Programme for Screening with a Pass to be Entitled for Nomination

2021年11月至2022年1月 • Nov 2021 to Jan 2022

第二階段：遞交提名資料
Stage 2: Submit Nomination Profiles

步驟四　簡介會：遞交提名資料的安排及網上提名平台操作
Step 4　Briefing Sessions: Arrangements for Submission of Nomination Profiles and Operation of the Online Nomination Platform

2022年3月 • Mar 2022

步驟五　透過網上提名平台遞交提名資料作進一步甄選
Step 5　Submit Nomination Profiles for Further Screening through the Online Nomination Platform

2022年2月至3月 • Feb to Mar 2022

步驟六　透過網上提名平台查閱提名結果並註冊成為學員
Step 6　Check Nomination Results and Register as Student Members through the Online Nomination Platform

2022年6月 • June 2022

註：每學年的實際時間表以網頁公布為準
Remark: Please refer to our website for the exact timeline of each school year

網上學習的利器

背景及簡介

2020年初，2019冠狀病毒病爆發，學校取消恆常面授課堂。部分課堂改以網上形式進行，學生需獨自留家學習。為此，了解學生於網上學習的情況，以及認識影響這種學習模式果效的主要因素是重要的。

收集數據方法

香港資優教育學苑（學苑）研究部門於 2020 年 6 月底至 7 月中進行網上問卷調查，訪問學苑的資優學員家長，收集他們對子女網上學習的表現有何看法。調查重點包括：

(i) 2019冠狀病毒病的影響，特別是對子女學習的影響，
(ii) 人口特徵（如學校類型和就讀年級），以及
(iii) 某些可能影響他們子女學習的因素（如學校支援和家庭支援等）。

共 362 名學員家長完成了問卷，回應率為 8.43%。

相關屬性及其關聯

家長被問及於疫情期間，他們認為子女在家學習的成效如何。結果發現 56.6% 受訪者表示子女能在一星期內適應「在家學習」，31.5% 則在一個月但超過一星期內適應。然而，12.9% 家長認為他們的子女需要 1 個月以上時間適應。

超過半數家庭的子女能在一星期內適應網上學習，這點令人鼓舞，但是不同學員適應在家學習模式所需的適應時間差異頗大。為此，學苑研究部門嘗試找出導致這種差異的因素。研究針對 10 個因素，並歸類為以下 4 個方面：

(i) 人口特徵：

- 就讀年級：小學 或 中學
- 兄弟姐妹：有 或 沒有
- 學校類型：直資 或 其他學校

(ii) 所得的支援：

- 家庭於環境及設施上的支援（1-10）
- 學校對在家學習的支援（1-10）

(iii) 學員個人能力：

- 時間管理能力（間接量度）（1-10）
- 專注學習能力（間接量度）（1-10）

(iv) 家長背景和親子關係：

- 教育背景（碩士 / 大專 / 中學程度）
- 幫助子女學習的能力（1-10）
- 親子關係（有改進 / 不變 / 轉差）

分析方法 — 粗糙集理論（RST）

研究使用粗糙集理論（Rough Sets Theory, RST; 請參考 [1]），從數據中找到數據屬性中的結構性關聯。RST 是根據已知的訓練數據 (Training Data Set) 得出等價類 (Equivalence Class)。所有組成等價類的數據組合都是不可識別的 (Indiscernible)，亦即是各個樣本在基於數據的屬性上完全一致。而在真實世界取得的數據中，往往無法按現有屬性辨認出某些類別，但卻可以等價類來大約或粗略定義這些數據類別。使用粗糙集理論分析數據的主要優點，在於分析的過程中不需要任何額外的數據資料或假設 — 例如統計學的概率。

套用 RST 的術語，是次研究有十個條件屬性 (Conditional Attributes)，例如：「人口特徵」及「所得的支援多寡」等和一個決策屬性 (Decision Attribute):「適應網上學習所需的時間」。我們可應用 RST 判斷決策屬性對條件屬性有多大關聯，這種關聯一般來說適用於屬性具有離散數值。因此，具有連續數值的屬性必須經離散化後方可使用。總括而言，使用粗糙集解決數據分析基本問題的步驟如下：

- 根據條件屬性為數據分類
- 找出屬性間的關聯程度
- 約簡多餘的屬性
- 找出最顯著的屬性
- 得出決策規則

數字數據離散化

在（傳統的）RST 下，所有屬性 / 變項都應是離散的。因此，必需將數值介乎 1-10 的變項分成若干個組別。是次研究中，每個具數值的屬性都被分成 k=4 個組別，而每個組別包含的數據量大致相同。

屬性的關聯度及重要性

RST 裏的 B- 正域（POS_B），是定義為按照條件屬性 B 能確定得出唯一決策屬性，從而能明確分類的數據集合。故決策屬性 d 對條件屬性集 B 的關聯度 γB 定義為：

$$\gamma_B = \frac{|POS_B|}{|U|}$$

這裏的 U 代表所有數據和 ISI 表示集合 S 中的數據數量。

承上，透過找出移除其中一個屬性 b 後的關聯度的差異，即可得出屬性 b 的重要性：

屬性 b 的重要性 = $\gamma_B - \gamma_{B-b}$

最小的屬性集（約簡）

將數據離散化後，使用RST分析數據的第一步，是在保持大致差不多屬性關聯度(γB)的情況下，盡量減少條件屬性(B)的數量。據此得出的條件屬性子集稱為決策約簡（Decision Reduct）。我們可使用貪婪策略(Greedy Strategy)啟發的算法，能夠計算出近似的（Approximated）決策約簡。在算法中，參數Quality (F)度量屬性子集F的質量值。這度量有助尋找近似的決策約簡。它們可用以估算在加入某個屬性後，所增加的資訊有多少，例如：可以使用集合的熵（Entropy）數值代表增加了的資訊量度量，而是次研究也有使用熵這個度量。此外，可以透過 ϵ 參數值計算 ϵ - 近似約簡（ϵ -approximate reduct），它定義為滿足以下條件而不能再約簡的屬性子集B：

$$Quality_{\mathcal{A}}(B) \geq (1-\epsilon)Quality_{\mathcal{A}}(A)$$

其中 $Quality_{\mathcal{A}}(B)$ 是決策表 $\mathcal{A}$ 中屬性子集 B 的質量值，A是包含所有條件屬性的集合，*而* ϵ 則是一個介乎 0-1 的數值近似。在是次研究中，ϵ 值設定為 0.1。

歸納決策規則

歸納規則 (Rule Induction) 是機器學習 (Machine Learning) 裏其中一個最重要的技巧。由於數據間的規律經常以規則展現，因此歸納規則亦是其中一個最基本的挖掘數據工具。規則通常用以下列方式表示：

If（屬性-1；數值-1）and（屬性-2；數值-2）and .....
and（屬性-n；數值-n）then（決策；數值）

LEM2（請參考[2]）是建基於RST的一種搜索規則的歸納算法，是次研究應用此算法找出隱藏於數據間的規律，且以規則表示，LEM2使用所有可能的屬性值對 (Attribute-value Pair) 作為搜索空間，為每個決策屬性組別得出一個「局部」覆蓋 (Local Covering)。

分析結果

如先前提到，是次研究的決策屬性*d*及條件屬性*B*（以簡寫表示）定義如下：

d= { 適應時間 }
B= {專注學習、時間管理、兄弟姐妹、年級、家長學歷、家長能力、家庭支援、親子關係、學校類別、學校支援 }

研究團隊隨機抽出60% 原始數據（217則數據）為訓練數據集 (Training Data Set)，剩下的145則數據則為測試集 (Testing Data Set)。

d（決策屬性）對 B（條件屬性）的關聯度及約簡

「數字」數據離散化後，d 對 B 的關聯度為**0.97**，數值非常高。應用貪婪策略啟發的算法，我們計算出一個 ϵ - 近似約簡（ϵ 值設定為0.1）*B1*，它包含六個屬性：

B1= { 專注學習、時間管理、家長學歷、家庭支援、親子關係、學校支援 }

d 對B1的關聯度是**0.85**。在移除屬性集B2 = { 兄弟姐妹、年級、家長能力、學校類型 }，這個數值仍是相當高。值得注意的是，d 對B2的關聯度只有0.04。透過量度移除個別屬性後關聯度的變化，我們得出B1裏各個屬性的顯著性量度。這六個屬性的顯著性量度由高至低展列如下：

屬性	顯著性量度
學校支援	**0.24**
家庭支援	**0.24**
親子關係	**0.19**
專注學習	**0.18**
時間管理	**0.16**
家長學歷	**0.15**

為了更清楚理解以上六個屬性對適應網上學習所需時間的影響，以下利用數據交叉表中的橫排百分數 (row percentage) 展示每個屬性比對不同 *適應時間長短* 的關係：

學校支援 比對 *適應時間的長短*	短	中	長
4以下	0.596	0.255	0.149
4	0.500	0.357	0.143
5-7	0.392	0.495	0.113
8或以上	0.678	0.254	0.068

家庭支援 比對 *適應時間的長短*	短	中	長
5以下	0.463	0.390	0.146
5-6	0.389	0.500	0.111
7-8	0.525	0.328	0.148
9或以上	0.672	0.279	0.049

專注學習 比對 *適應時間的長短*	短	中	長
2以下	0.390	0.390	0.220
2-3	0.500	0.339	0.161
4-5	0.537	0.439	0.024
6或以上	0.603	0.342	0.055

時間管理 比對 *適應時間的長短*	短	中	長
2以下	0.377	0.415	0.208
2	0.391	0.478	0.130
3-5	0.506	0.390	0.104
6或以上	0.703	0.266	0.031

親子關係 比對 *適應時間的長短*	短	中	長
轉差	0.413	0.370	0.217
不變	0.553	0.353	0.094
有改善	0.547	0.384	0.070

家長學歷 比對 *適應時間的長短*	短	中	長
中學或以下	0.610	0.341	0.049
大專	0.432	0.400	0.168
碩士或以上	0.550	0.350	0.100

從上表可見，學員有強大的學校與家庭支援，以及良好的自學能力（即專注學習和時間管理能力），將相對有更大機會在短時間內適應網上學習模式（即一星期內）。另外，親子關係「轉差」可能有負面影響。然而，關係「不變」或「有改善」之間的差異不大。

而 *家長學歷* 比對 *適應時間長短* 之數據交叉表中的橫排百分數令人有點困惑。家長學歷 為「中學或以下」，短時間適應的百分比為最高。為了進一步探索可能的原因，以下列出 *家長學歷* 比對 *專注學習*，以及 *家長學歷* 比對 *時間管理* 的數據交叉表：

家長學歷 比對 專注學習	2以下	2-3	4-5	6或以上
中學或以下	0.20	0.27	0.16	0.38
大專	0.19	0.32	0.16	0.34
碩士或以上	0.17	0.25	0.32	0.25

家長學歷 比對 時間管理	2以下	2	3-5	6或以上
中學或以下	0.21	0.11	0.35	0.33
大專	0.26	0.11	0.36	0.27
碩士或以上	0.28	0.10	0.35	0.28

從上表可見，家長學歷為「中學或以下」的學生似乎在自主學習上的表現相對比較好。

歸納規則

研究使用規則歸納算法 LEM2 為每個決策屬性組別生成若干條規則，得出共 **100 條規則**。當中決策組別 =1（即一星期內適應）有 44 條規則、決策組別 =2（一星期至一個月）有 41 條規則，而決策組別 =3（一個月以上）就有 15 條規則。

將這規則集套用至測試數據集，正確率為 60%（註：將同一規則集套用至訓練數據集時，正確率高達 92%）。以下情況的平均正確率可以作為參考：在隨意猜測一個學生的決策組別時（即適應時間），100 次試驗中，平均正確率為 33.4%。若根據訓練數據集的決策組別比例來隨意猜測，平均正確率則為 43.0%。

以下列出決策組別 =1 和決策組別 =3 的某些規則，作為參考範例：

決策組別 = 1（一星期內適應）	
規則一：*家長學歷 =「中學或以下」及 專注學習 =「6或以上」及 時間管理 =「6或以上」及 家庭支援 =「9或以上」*	→ *決策組別 = 1*
規則二：*親子關係 =「有改善」及 時間管理 =「6或以上」及 家庭支援 =「7-8」及 學校支援 =「5-7」*	→ *決策組別 = 1*
決策組別 = 3（一個月以上適應）	
規則三：*專注學習 =「2-3」及 家庭支援 =「7-8」及 學校支支援 =「4以下」*	→ *決策組別 = 3*
規則四：*親子關係 =「轉差」及 時間管理 =「2以下」及 家庭支援 =「5-6」及 學校支援 =「5-7」*	→ *決策組別 = 3*

總結

為了解香港資優教育學苑的學員在 2019 冠狀病毒病下，轉至網上學習模式的情況，研究團隊在 2020 年中進行網上問卷調查，收集家長對子女學習表現的意見。根據所收集的實際數據，觀察如下：

i. 從適應新學習模式的所需時間來看，大部分學員似乎都能挺理想地適應網上學習。不過，約 10% 學生需要多於一個月適應這種新學習模式，約 6% 更需要多於兩個月。

ii. 使用 RST 方法，以下依照高至低的顯著性量度列出各個因素 / 屬性，它們都對適應網上學習效率有相對顯著的關聯：

- 學校支援
- 家庭支援
- 親子關係
- 專注學習能力
- 時間管理能力
- 家長教育背景

使用從以上因素得出的決策規則來估計學生適應網上學習的所需時間，正確率比隨意猜測高出將近一倍。

iii. 有趣的是，相對於學歷為大專或以上的家長，擁有「中學或以下」學歷的家長的子女似乎在學習上更為自主。

參考文獻：

[1] Z. Pawlak and A. Skowron (2007) Rudiments of rough sets, *Information Sciences* 177(1):3-27 January 2007.

[2] P. Dhandayudam and I. Krishnamurthi (2013) Customer Behavior Analysis Using Rough Set Approach, *Journal of Theoretical and Applied Electronic Commerce Research* ISSN 0718–1876 Electronic Version VOL 8 / ISSUE 2 / AUGUST 2013 / 21-33 © 2013 Universidad de Talca – Chile (This paper is available online at www.jtaer.com DOI: 10.4067/S0718-18762013000200003)

Sharp Weapons *for* Online Learning

Background and Introduction

In Hong Kong, regular face-to-face classes have been cancelled in schools due to the outbreak of COVID-19 in early 2020. Part of them was replaced with online learning ones. Students had to learn alone at home. In this regard, it is important to understand students' learning situations when switching to online mode and the factors that might associate with their successful experiences or failures.

Data Collection

An e-survey was conducted between end-June and mid-July 2020 to collect views from parents of gifted student members of the HKAGE on their children's online learning performance. The focuses of the survey were: (i) Impacts of COVID-19; especially in their children's learning, (ii) some demographic characteristics (e.g., school type and study level), and (iii) some related factors that may affect their children's learning (e.g., school support and family support, etc.). A total of 362 members' parents completed the survey with a response rate of 8.43%.

Attributes Concerned and Their Associations

Parents were asked to provide responses to their perceived effectiveness of their children's learning at home during the coronavirus outbreak. It is found that 56.6% responded that their children could adapt themselves to 'at-home learning' in less than a week. 31.5% could adapt within a month, but more than a week. However, 12.9% required more than a month.

It is encouraging to learn that the children in more than half of the families could adapt to online learning within a week. However, there were quite large variations in the duration of adapting the mode of learning at home. The research team was interested to explore the factors associated with this kind of differences. Ten factors were under consideration, and delineated into the following four aspects:

(i) Demographic Characteristics:
- Study Level: Primary vs Secondary
- Having Siblings: Yes vs No
- School Type: (Direct Subsidised vs Others)

(ii) Degree of Support Received:
- Family Support in terms of Environment and Facilities (1-10)
- School Support for Learning at Home (1-10)

(iii) Personal Skills of Students
- (A Proxy Measure of) Time Management Skill (1-10)
- (A Proxy Measure of) Focused Learning Skill (1-10)

(iv) Parental Background and Relationship
- Education Background (Post-graduate/ Graduate/ Secondary Level)
- Self-perceived Ability in Helping Their Children's Learning (1-10)
- Parental Relationship (Getting better / No change / Getting worse)

Analysis Methodology – Rough Sets Theory (RST)

In the study, Rough Set Theory (RST) (see [1]) was used to discover structural relationships within data. RST is based on the establishment of equivalence classes within the given training data. All the data tuples forming an equivalence class are indiscernible, that is, the samples are identical with respect to the attributes describing the data. Given real-world data, it is common that some classes cannot be distinguished in terms of the available attributes. These equivalence classes can be used to approximately or roughly define such classes. The main advantage of using RST in data analysis is that It does not need any additional information or artifacts about data – like probability in statistics.

For the current study, in the terminology of RST, we have 10 conditional attributes (e.g., Demographic Characteristics and Degree of Support Received, etc.) and 1 decision attribute (Time Taken for Adaptation to Online Learning). The dependency of the decision attribute on the conditional attributes could be gauged using RST, which applies to discrete-valued attributes. Continuous-valued attributes must therefore be discretised before their uses. In a nutshell, basic problems and steps in data analysis solved by Rough Set are as follows:

- Characterisation of a set of objects in terms of attribute values
- Finding dependency between the attributes
- Reduction of superfluous attributes
- Finding the most significant attributes
- Decision rule generation

Discretisation of Numeric Data

In RST, the B-positive region (POS_B) is defined as the set of data instances that can be certainly classified with respect to their decision attributes using their conditional attributes B. The degree of dependency of the decision attribute d on the set of conditional attributes B is γ_B , which is defined as:

$$\gamma_B = \frac{|POS_B|}{|U|}$$

where U stands for all data instances,

|S| is the number of elements in the set S.

Accordingly, the significance of an attribute, b could be assessed using the change in the dependency due to dropping the attribute concerned, i.e.

The significance of the attribute b = $\gamma_B - \gamma_{B-b}$

Minimal Set of Attributes (Reduct)

After discretisation, the first step of data analysis using RST is to reduce the number of conditional attributes when maintaining

'more or less' the same degree of dependency. The resultant subset of conditional attributes is called a decision reduct. A greedy heuristic algorithm could be used for computing decision reducts (or approximate decision reducts). In this implementation, some attribute subset quality measures can be passed to the algorithm by the parameter *Quality (F)*. Those measures guide the computations in the search for a decision/approximated reduct. They are used to assess the amount of information gained after the addition of an attribute. One of the possible candidates is the *entropy* of the set concerned, which corresponds to the information gain measure. The measure entropy was adopted in the study. Additionally, this function can use the value of the epsilon parameter in order to compute an ϵ-approximate reduct. The ϵ-approximate reduct is defined as an irreducible subset of attributes *B*, such that:

$$Quality_{\mathcal{A}}(B) \geq (1-\epsilon)Quality_{\mathcal{A}}(A)$$

where $Quality_{\mathcal{A}}(B)$ is the value of a quality measure for an attribute subset *B* in decision table $\mathcal{A}$ and ϵ is a numeric value between 0 and 1 expressing the approximation threshold. In this study, ϵ was set to 0.1.

Induction of Decision Rules

Rule induction is one of the most important techniques of machine learning. Since regularities hidden in data are frequently expressed in terms of rules, rule induction is one of the fundamental tools of data mining. Usually, rules are expressions of the form:

if (attribute-1; value-1) and (attribute-2; value-2) and …
and (attribute-n; value-n) then (decision; value)

LEM2 (see [2]) is a rule induction algorithm based on RST, which was used in the study. It finds regularities hidden in the data by treating all possible attribute-value pairs as the searching space and in terms of rules, representing a 'local' covering for each class of the decision attribute.

Analysis Results

As mentioned above, the decision attribute *d* and conditional attributes *B* of this study (in an abbreviation) were defined as follows:

d= { Adapt_Time }

B= { Focused, Time_Manage, Sibling, Study_Level, Parent_Ed, Parent_Ability, Family_Supp, Parent_Relate, Sch_Type, Sch_Supp }

60% of the original data (217 data instances) were randomly selected as the training data set, while the rest of them (145 data instances) were used as the testing one.

Dependency of d (Decision Attribute) on B (Conditional Attributes) and Reduct

After discretising the 'numeric' data in the original data set, dependency of *d* on *B* was found to be **0.97**, which was very high in value. Using the greedy heuristic algorithm for computing an approximate decision reduct (with ϵ being set to 0.1), the following set *B1* with six attributes has been resulted:

B1= { Focused, Time_Manage, Parent_Ed, Family_Supp, Parent_Relate, Sch_Supp }

Dependency of *d* on *B1* was found to be **0.85**, which was still pretty high after dropping the set B2 of four attributes, *{Sibling, Study_Level, Parent_Ability, Sch_Type}*. It should be noted that the dependency of *d* on *B2* was found to be only 0.04. The significance of each attribute in *B1* was measured based on the change in dependency after dropping the attributes concerned. The results of significance of these six attributes sorted in decreasing order are shown below.

Attribute	Significance
School_Support	**0.24**
Family_Support	**0.24**
Parent_Relationship	**0.19**
Focused	**0.18**
Time Management	**0.16**
Parent_Education	**0.15**

To better understand the impacts of these six attributes on the time for adaptation of online learning, the row percentages of the cross-tabulations of each attribute vs Adapt_Time are shown below.

Sch_Supp vs Adapt_Time			
	short	moderate	long
below 4	0.596	0.255	0.149
4	0.500	0.357	0.143
5-7	0.392	0.495	0.113
8 or above	0.678	0.254	0.068

Family_Supp vs Adapt_Time			
	short	moderate	long
below 5	0.463	0.390	0.146
5-6	0.389	0.500	0.111
7-8	0.525	0.328	0.148
9 or above	0.672	0.279	0.049

Focused vs Adapt_Time			
	short	moderate	long
below 2	0.390	0.390	0.220
2-3	0.500	0.339	0.161
4-5	0.537	0.439	0.024
6 or above	0.603	0.342	0.055

Time_Manage vs Adapt_Time			
	short	moderate	long
below 2	0.377	0.415	0.208
2	0.391	0.478	0.130
3-5	0.506	0.390	0.104
6 or above	0.703	0.266	0.031

Parent_Relate vs Adapt_Time			
	short	moderate	long
worse	0.413	0.370	0.217
No chg	0.553	0.353	0.094
better	0.547	0.384	0.070

Parent_Ed vs Adapt_Time			
	short	moderate	long
secondary or below	0.610	0.341	0.049
graduate	0.432	0.400	0.168
post-grad or abv	0.550	0.350	0.100

The tables shown above indicates that it would be beneficial for a student to have strong school and family support, and good self-learning skills (i.e. focused learning and time management skills) so that he/she could have a relatively high chance of adapting to online learning mode within a short period of time (i.e. within a week). Besides, getting 'worse' parent relationship might have a negative impact. However, there was not much difference between 'no change' and 'better' relationship.

The row percentage figures of the crosstabulation of *Parent_Ed vs Adapt_Time* were a bit confused. *Parent_Ed* equal to 'secondary or

below' had the largest value for the proportion of short duration of adaptation time. To explore possible reasons behind this, the crosstabulations *Parent_Ed vs Focused* and *Parent_Ed vs Time_Manage* are shown below.

Parent_Ed vs Focused				
	below 2	**2-3**	**4-5**	**6 or abv**
secondary or below	0.20	0.27	0.16	0.38
graduate	0.19	0.32	0.16	0.34
post-grad or abv	0.17	0.25	0.32	0.25

Parent_Ed vs Time_Manage				
	below 2	**2-3**	**3-5**	**6 or abv**
secondary or below	0.21	0.11	0.35	0.33
graduate	0.26	0.11	0.36	0.27
post-grad or abv	0.28	0.10	0.35	0.28

From above, it seems that students, whose parents' education level was 'secondary or below', could be relatively more self-independent in learning.

Rule Induction

The rule induction algorithm, LEM2, was deployed to generate rules for each class of decision attributes. A total of **100 rules** was resulted (44 rules for decision class = 1 (i.e., within one week), 41 rules for decision class = 2 (i.e., between 1 week and 1 month), and 15 rules for decision class = 3 (i.e., more than 1 month)).

When applying this set of rules to the testing data set, the percentage of correctness was 60%. (Note: when applying this set of rules to the training data set, the percentage of correctness was up to 92%.) For the sake of comparison, it should be noted that when randomly guessing the decision class of a student (i.e. adaption time), the mean of the percentage of correctness was 33.4% obtained from 100 trials. When randomly guessing according to the proportions of decision classes in the training data set, the mean of the percentage of correctness was 43.0%.

As an illustration, some rules for decision class = 1 and decision class = 3 are shown below.

Decision class =1 (i.e. within one week)	
Rule 1: *Parent_Ed= 'secondary or below' & Focused = '6 or above' & Time_Manage = '6 or above' & Family_Supp = '9 or above'*	→ *Dec Class = 1*
Rule 2: *Parent_Relate='better' & Time_Manage = '6 or above' & Family_Supp ='7-8' & School_Supp='5-7'*	→ *Dec Class = 1*
Decision class =3 (i.e. more than 1 month)	
Rule 3: *Focused = '2-3' & Family_Supp='7-8' & School_Supp = 'below 4'*	→ *Dec Class = 3*
Rule 4: *Parent_Relate = 'worse' & Time_Manage = 'below 2' & Family_Supp = '5-6' & School_Supp='5-7'*	→ *Dec Class = 3*

Summary

To understand student members' situations in the HKAGE when switching to online learning mode due to the outbreak of COVID-19, an e-survey was conducted in mid-2020 to collect parental opinions on their children's learning performance. From the empirical data collected, the followings are observed:

i. From the time taken to adapt to the new mode of learning, it seemed that the majority of student members could adapt to online learning quite well. However, around 10% of them required more than one month to adapt the new learning mode and around 6% required more than two months.

ii. Using the RST approach, the following factors/attributes sorted in decreasing order of significance had prominent associations with the efficiency of adaptation to online learning:

- School Support
- Family Support
- Parental Relationship
- Focused Learning Skills
- Time Management Skills
- Parent Education

Using the decision rules based on these factors, it is found that the correctness of prediction of students' adaptation time to online learning was nearly doubled, as compared with that of a random guess.

iii. It is interesting to note that student members whose parents' education levels were 'secondary or below' seemed to be more self-independent in learning as compared with those whose parents' education levels were graduate or above.

References:

[1] Z. Pawlak and A. Skowron (2007) Rudiments of rough sets, *Information Sciences* 177(1): 3-27 January 2007.

[2] P. Dhandayudam and I. Krishnamurthi (2013) Customer Behavior Analysis Using Rough Set Approach, *Journal of Theoretical and Applied Electronic Commerce Research* ISSN 0718–1876 Electronic Version VOL 8 / ISSUE 2 / AUGUST 2013 / 21-33 © 2013 Universidad de Talca – Chile (This paper is available online at www.jtaer.com DOI: 10.4067/S0718-18762013000200003)

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