i-Journey

Paid Non-local Study Leave Scheme for Secondary School Teachers

COME WITH AN INQUIRY LEAVE INSPIRED

"iMPACT"

A fruitful learning experience and achievement in '*i-Journey*'

Compendium of '*i-Journey*' (1st cohort)

ISSUE 1

Contributed by '*i-Journey*' participants (1st Cohort) and their schools

Edited by the Education Bureau, the HKSAR Government &

the Hong Kong Baptist University

'i-Journey'

Paid Non-local Study Leave Scheme for Secondary School Teachers

The ***'i-Journey'*** Paid Non-local Study Leave Scheme for Secondary School Teachers (the Scheme) has been a new education initiative pledged in the 2017 Policy Address.

The Scheme has been a three-year pilot scheme for serving secondary school teachers. Through providing overseas professional development activities of a longer duration, with study leave for teachers and funding support for employment of supply teachers for schools, the Scheme aims to –

- enhance teachers' professional capacity and inspire them with the latest global education developments;
- promote a culture of research and inquiry in schools that brings positive changes and impact on learning and teaching; and
- create space for teachers to undertake professional development activities on a full-time basis.

The "i" in ***'i-Journey'*** refers to the three crucial elements of this Scheme – inquire, inspire, and impact, and together they make a fruitful learning journey for the participants. The whole learning journey begins with participants' inquiry into a particular educational topic or concern, followed by their being inspired in the process, and most importantly, ends with the impact they would bring to their teaching, student learning as well as school development.

The first cohort of customised programmes, with a total of 50 participating teachers, took place between April and June 2018. Three customised programmes on different themes were devised, namely:

(1) Interdisciplinary Learning & Entrepreneurship Education
(2) Catering for Students with Special Educational Needs
(3) STEM Education

Each of these three customised programmes included the following major components:

Phase One (2017/18 s.y.)	**i. Pre-trip Preparation:** A one-week period in Hong Kong for research and development of a school-based project proposal and participating in related courses / activities
	ii. Overseas Experience: A five-week period of structured learning and school attachment / visits abroad, during which participants further develop and finalise their proposals with the knowledge and experience gained
	iii. Post-trip Consolidation: A two-week period upon returning to Hong Kong for consolidation, write-up of a detailed implementation plan for the school-based project and participating in related courses / activities
Phase Two (2018/19 s.y.)	**iv. Implementation of Finalised Proposal:** A one-year period for the implementation of the school-based project in participant's schools with a view to bringing positive changes; and the sharing of good practices with a larger professional community

This publication, iMPACT, provides a glimpse of the participants' valuable experiences of project implementation and insights from the fruitful ***'i-Journey'***. The first of this issue features 18 selected reports from the first cohort's participants and comes with a range of project ideas and details that could serve as a source of inspiration for other educators.

Programme A(1) – Interdisciplinary Learning and Entrepreneurship Education

Early April – Early June 2018

Helsinki & Jyväskylä, Finland

Administered by the Education Bureau, the Programme consisted of both local and overseas components. While the local part of the programme was supported by Department of Education Studies, The Hong Kong Baptist University, the overseas customised programme was conducted by the Faculty of Education and Psychology (FoEP), University of Jyväskylä.

The customised overseas programme aimed to enable participants to

(a) acquire knowledge of the Finnish education system and its key features as well as the focus of basic education in Finland;
(b) learn about the Educational Reform completed in 2015 and the new National Core Curriculum implemented in August 2016 in Finland and the latest development, in particular interdisciplinary learning / entrepreneur education and phenomenon-based learning;
(c) enrich their knowledge and views of education and school development;
(d) integrate structured learning and attachment experience to become reflective practitioners;
(e) broaden professional knowledge base and build good practices; and
(f) develop teacher leadership through sharing learning outcome in Professional Learning Communities (PLCs) and disseminating good practice, with a view to inspire paradigm shifts in interdisciplinary learning/entrepreneur education.

Entrepreneurship Trend in Kwai Chung

Vikki CHOI Hoi-ki
S.T.F.A. Lee Shau Kee College

Why Entrepreneurship in the Locality?

Given that Hong Kong's economic structure lacks diversity, both parents and schools consider science and business streams better choices for further studies, believing that these disciplines can guarantee the ability of their children and students to afford Hong Kong's high cost of living in the future. Under this climate, it has become a trend in recent years to see students who excel in science or business subjects (for which it is comparatively easier to achieve good grades) receive praise, while those who perform well in extracurricular activities or possess other admirable qualities go unrecognised. This mindset causes students to be short-sighted in their academic pursuits. It is especially regrettable that a small number of authoritative parents take away their children's liberty to choose the subjects they want to study at Secondary Three and compel them to select either the science or business stream under the justification that these subjects promise a brighter future. This shows that it remains the dominating view of the society as a whole that students' study should be anchored to mainstream career choices, and students are left with little space and freedom to explore the directions of their future development. As a result, young students are stifled in their attempt to take control of their destiny.

The Finnish system is quite the opposite. After proceeding to Secondary Three, students can choose between schools that prepare them for admission to universities and those that provide vocational training. They may assess whether they are capable of pursuing more advanced programmes and chart their own course. The

freedom that students have in deciding what subjects to take and which classes to attend are similar to that of undergraduates. With such increased autonomy, students' learning motivation is boosted.

Our school has always attached great importance to the training of student leaders and to this end, we have provided students with a wide variety of extra-curricular activities. However, some students have failed to develop an interest in or gain satisfaction from studying conventional junior secondary subjects. They neglect their studies and lack the zeal for learning, which is especially the case during Visual Arts lessons. Moreover, the content covered by examinations today and the way candidates are required to respond to questions cannot prepare students for a career in emerging industries. To enhance the interface between secondary school learning and social reality, our school has incorporated entrepreneurship education into Secondary Three Visual Arts education for the first time. Kwai Fong was chosen as the locality for experimenting entrepreneurship. With entrepreneurial spirit and visual identity as a starting point, we engaged everyone at Secondary Three in a class-based group project.

Starting Off with Entrepreneurial Spirit

The project offered to students an opportunity to analyse the entrepreneurial spirit in Kwai Fong, or specifically in the Kwai Chung Plaza, through the case study of a small-sized egg seller. Students started by repackaging with a new design and proceeded to developing a viable business model or product. Teachers were mainly responsible for guiding students in learning about how a new business is run in reality, what problems it faces and what marketing strategies it needs. Students were encouraged to try their hands at using marketing statements or creative narratives to sell eggs and reflect on how trendy brands spur consumption by creating desires and boosting the image of teenagers in today's society.

Coming Up with a New Design and Business Plan

First, students were divided into groups to prepare an eight-minute class presentation supported with a promotional video and a business plan. The videos were uploaded to Google Classroom the day before presentation. Each group, led by its leader, took turns to give a brief overview of their business. The whole class then compared the viability of different business plans. Through peer assessment, students' ability to appreciate others' work was enhanced. The groups cast their votes once all the presentations were done.

Each class selected their favourite group in the last lesson, and the best video with the most votes received commendation. Teachers then guided students in writing down questions for reflection on memo slips. Examples include: "What difficulties did you encounter during the process?", "How did you contribute to your group?" and "What recommendations would you make if there was a relaunch of the project?"

Reflection and Improvement

From the perspective of creative vision, the promotional video of "POKATO", a skin-care essence made from potatoes, was a standout among all videos. But more importantly, the video featured an adapted song performed by the group members, highlighting the vivid image of their brand. The animated segments were fast-paced and fun to watch, proving just how well members of the group had worked together. As most students lacked experience in starting a business, the concepts they had adopted to sell products were

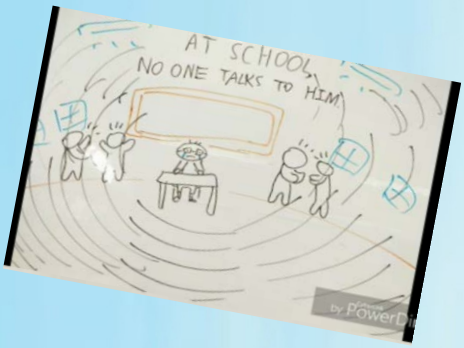
often commonplace and function-oriented, rendering the promotional videos not attractive to the majority. In the future, more references, such as case studies of companies and market intelligence can be given to students to spark their creativity. Tests may also be done to take inventory of students' interests.

Before the launch of this project, quite a number of students did not take the process of discussing and developing ideas seriously in Visual Arts lessons, and those not endowed with a drawing talent would only work on their assignments the day before deadline. By contrast, students demonstrated a higher level of involvement and dedication during their participation in this project. As far as setting lesson objectives is concerned, I reckon that students should not be given only a general objective in the future. I therefore suggest that we narrow down the scope and provide groups with specific topics to choose from, such as future foods, interactive applications that change our society, and products that can save the environment. It is in the best interests of the society to promote empathy and meaningful services, just in the way the group "Edge Breaker" gave support to marginalised peers by building a communication platform.

Before moving on to the next stage of starting a business, we should provide students with clear and detailed instructions to facilitate organisation of a group and enable better division of labour according to members' strengths. For example, students who are gifted artists can be assigned to create a three-dimensional product model while those who are eloquent and blessed with a more imaginative mind can devise strategies to market the special features of their products.

Lastly, regarding the assessment, it is difficult to gauge a student's capacity to act compassionately and proactively, to lead, to create, and to care for the community through timed written examinations adopted for academic subjects. These qualities can only be comprehensively assessed by carefully observing how individual members of each group fare during discussion or creative tasks in class.

In a typical classroom, group discussion should not be held for the sheer sake of raising the level of interactivity. Teachers should prepare challenging topics in advance, such as how to save a small local egg shop from closure, giving students the opportunity to deal with real products (in this case, as simple as eggs). Teachers will perform the role of facilitator by stimulating students' thinking and discussion. The whole process from introducing a topic of discussion to launching related activities should take a step-by-step approach to help students achieve fresh learning outcomes and explore likely career paths.



Dreamstarter

Simon LAU Chun-wah
United Christian College (Kowloon East)

Why was the Dreamstarter project undertaken in the first place?

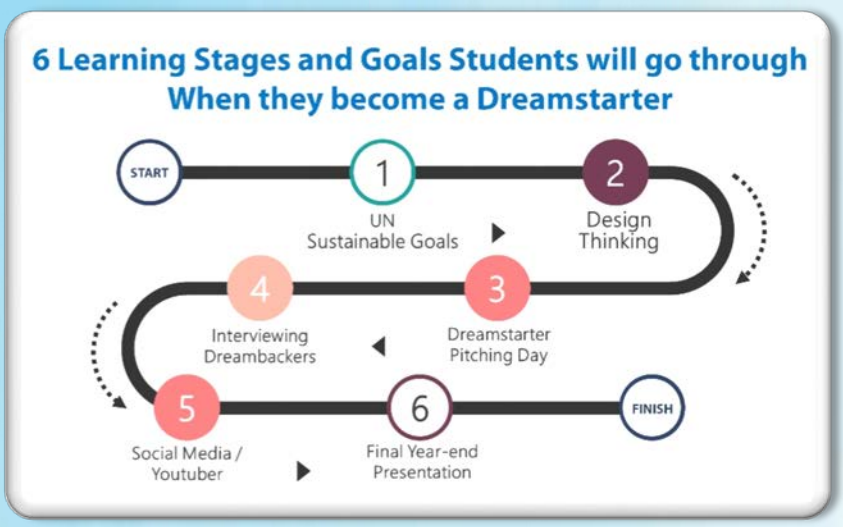
In recent years, Finland has been actively promoting phenomenon-based learning, which means that learning topics are taken from real world phenomena, such as the United Nations' 17 global goals for sustainable development, and the learning process is context-based and interdisciplinary in nature, with the objective of enabling students to analyse and solve problems holistically. Over the past three years, our school has been making active attempts to implement e-learning, flipped teaching, STEM education, etc. In our school, STEM has been developed as a new way of learning that integrates knowledge, skills and mindsets that are specific to different subject areas. While STEM stresses more on the integration of mathematics and science subjects, Liberal Studies emphasise the training of students' generic skills. Hence, schools have to provide more opportunities for students to apply what they have learnt in different contexts. Our school has also been encouraging students to take part in activities such as community services and short-time overseas mission trips.

To motivate students to review and examine the above-mentioned 17 issues of global concern and initiate a "dream project" on subjects of interest to them, we piloted the Dreamstarter project, under which Secondary Two students with one-year of STEM learning experience under their belts were selected to embark on a journey of dream-making. First of all, we had to incorporate the issues of

concern into the lessons of Liberal Studies. Participants were encouraged to immerse themselves in the activities of the community and experience the happenings around them. Using their imagination and creativity, they were expected to suggest practical solutions to problems identified and share them with different people.

How was the Dreamstarter project implemented?

Five out of the 17 issues of global concern, namely "Good Health and Well-being", "Quality Education", "Industry, Innovation and Infrastructure", "Responsible Consumption and Production", and "Peace, Justice and Strong Institutions", were selected by teachers for students to choose from. All Secondary Two students were then divided into 15 teams. Liberal Studies teachers guided students through the "design thinking" process to help them identify an area of sustainable development to work on. Each team had to create a dream project on the chosen area with a view to suggesting solutions and presenting their observations by following the four steps of empathising, imagining, practising and sharing.



On the Dreamstarter Pitching Day held at Cyberport, our school teams interacted with students from other schools and shared their dream-starting stories. Afterwards, they published their projects on the crowdfunding platform Collaction to secure resources for completion of their projects. Some teams even received funds or technical support from Dreambackers for organising activities such as seminars, visits and interviews. Working together with teachers, the teams gradually realised their dreams.

Unprecedented Challenges

However, we faced a lot of challenges along the way. Firstly, teachers had limited time to work with the students. As lesson time and scheduled meetings were inadequate for the needs of the projects, the teachers-in-charge had arranged additional teacher meetings and team sessions. Furthermore, Liberal Studies teachers had to devote lesson time to follow up on the progress of each team in the second school term.

Secondly, the projects varied in difficulty and the teams could not get hold of all the resources they needed. For instance, some teams wanted to apply knowledge gained from STEM education, while others tried to solve problems using new technology, which might not be the forte of every teacher. As a result, we had to seek outside help and focus on guiding students in their continued search for resources during the course of their projects. If we had our eyes set solely on the outcomes, the students might have been prompted to quickly change their plan or set a lower target. In the end, we did get some help after much trying.

Looking Ahead to the Coming Year

Although none of the teams managed to fully achieve their goals, they kept refining their projects and learnt a lot during the process. Unfortunately, they could not see their projects through due to time constraint and limited resources. Having considered the situation, we replaced the planned sharing exhibition with team-based evaluation meetings. Upon completion of review, the teachers-in-charge received strong backing from the principal to launch an enhanced project next year. Improvements to implementation details will include dedicating more time to teacher-student meetings; enhancing frontline teachers' identification with the project; changing the attitudes of participants, other teachers and students, and parents towards their involvement in the projects; and making necessary adjustments to the curriculum of Secondary Two Liberal Studies. With all these improvements in place, I believe that we can achieve better results next year.

The Next Generation Vehicle

Kaine PANG Yan-shing
Buddhist Wong Wan Tin College

iNQUIRE

As a teacher specializing in teaching an elective subject of the senior secondary curriculum, my experience has been limited to my own subject area. I wanted to see in Finland what can be done to manifest real interdisciplinary teaching.

iNSPIRE

The Finland's teachers showed me how I could extend my school-based vehicle-design project into another realm – the business realm, when they introduced to us the stories of different Finnish brands. They encouraged me to think about turning the vehicle-design project into a business startup project.

iMPACT

The Finns' curriculum emphasis on the "future" has been the most influential thought on me. I started to put this thinking into practice and included more "future" elements into my school-based project. This not only brought along more variety into our students' projects, but also urged us, the teachers, to re-examine our existing curriculum to develop into one that would suit students' needs in the future.

Where did the concept of "The Next Generation Vehicle" come from?

Over the past two to three years, our school has been actively promoting STEM education and has tried to incorporate elements of STEM into existing curricula. Subjects that received a big push included junior Integrated Science and Computer Literacy and senior Physics and Information and Technology. Taking a page from the Finnish pedagogies of phenomenon-based learning and entrepreneurship education, I started a project called "The Next Generation Vehicle" to engage students in understanding, exploring and contemplating the modes of transport available in Hong Kong as well as their future development from multiple perspectives. Students were also given a hands-on opportunity to create their own ideal future vehicles by integrating and applying knowledge and skills acquired from different subjects. In the course of the project, we promoted cross-curricular learning by linking up different subjects and pooling resources. Collaboration attempts were made with different parties within the school, including the Moral Education, Civic Education, Social Services and School Image Committees, to showcase students' achievements.

How did "The Next Generation Vehicle" come into being?

The project comprised Next Generation Vehicle Junior 1.0 (XJ1.0) and Next Generation Vehicle Senior 1.0 (XS1.0). XJ1.0 was a phenomenon-based learning programme with the Secondary Two Science curriculum at its core and elements of Computer Literacy and Visual Arts education incorporated, while XS1.0 was based mainly on the Secondary Four Physics curriculum and reinforced with cross-curricular elements of Information Technology, Visual Arts and Economics. The strategies adopted for these two modules focused on broad-based and small group participation, or STEAM ALL and STEAM SMALL. STEAM ALL means full participation of all Secondary Two students and all Secondary Four students taking Physics and Information Technology. STEAM SMALL, on the other hand, involves selection of students with greater potential and a keener interest in related areas to take part in STEAM competitions.

Next Generation Vehicle Junior 1.0 (XJ1.0)

XJ1.0 was based mainly on the Secondary Two curriculum, and built on two Secondary One science subjects, namely Scientific Exploration and Creative Invention. Under the theme of "The Next Generation Vehicle", students studied mechanics, electrical circuits, programming, presentation and product design, with a view to constructing a model of their ideal future vehicles and presenting their creation to an audience. The programme consisted of two parts. In the first part, teachers of Science and Computer Literacy worked together to equip students with skills in data collection and presentation (for example, using tools such as PowerPoint Designer). During extended holidays, students were given the task to search the Internet for information on future vehicles and prepare a PowerPoint presentation using the provided template and following given instructions. In the second part, students learnt to assemble and programme electric model cars using the LEGO EV3 building set in their Computer Literacy class. The learning of programming skills centred on the performance of specific tasks. Students learnt the programming language and logic for making an electric vehicle following a given path, with a view to simulating unmanned programmed driving of the future.

To test the models of future vehicles that students could come up with, two Secondary Two students were picked by teachers to participate in the Cars of Tomorrow Design Competition organised by the Kaleb Creative Science. In the competition, contenders had to use the materials provided to design and construct a concept car model, film the making process, and give a presentation on their creation. It was an invaluable experience for the students as they learnt a great deal from the making process.

Next Generation Vehicle Senior 1.0 (XS1.0)

XS1.0 targeted mainly Secondary Four students. Building on their junior foundation, students acquired additional knowledge in economics, physics and information technology that bears relevance to the development of transport, and transformed the XJ1.0 models into passenger-carrying electric vehicles. The programme comprised roughly four stages. The first stage began by grouping 16 Secondary Four Physics students into three teams, and covered skills in assembling of an electric go-kart, the Internet of Things and programming under the theme of the next generation electric vehicles. The second stage commenced when students had basically finished assembling a go-kart. Imagining that they were establishing a startup business, the three teams were each required to write a simple proposal with a budget plan and sell it to investors (i.e. teachers and mentors) in order to obtain funding for turning their go-karts into the ideal electric vehicles they had in mind. In the third stage, the three teams presented their designs, and teachers allocated out of limited resources a varying amount of grant to each team according to its design. The teams purchased materials as needed or collected recyclable materials for modifying their go-karts. Finally, upon completion of the modification work, a test drive was arranged for the electric vehicles, the performance of which was evaluated by teachers and other students. At this final stage, students also presented their learning outcomes. Our school has shared such achievements with various parties. For example, the Hong Kong Cable Television was invited to try out and give feedback on the electric vehicles; committee members of the Community Care Fund were invited to inspect the vehicles on the campus; and 30 primary school students were given a chance to experience the fun of driving these vehicles.

Moreover, the teams were invited to visit the Allianz E-village during the 2019 Hong Kong E-Prix, where they saw the BMW's latest electric cars and concept cars and gained insights into the ideas and concepts behind these future vehicles.

How could XJ1.0 and XS1.0 be improved?

XJ1.0 allowed students to make their first foray into the world of future vehicles. Judging from the pleasing presentations given by the students, XJ1.0 was quite a success. However, the design of the lesson plans and assignments was limited in scope as it was hamstrung by a lack of cross-curricular collaboration. In the coming year, there could be attempts to collaborate with Geography and History teachers to enlighten students on the relations between transport facilities and urban development, and between development of transport vehicles and Industrial Revolution. Cooperation with the Reading Team could also be considered to find articles on future vehicles for students to read. Computer Literacy teachers could be more heavily engaged in enriching students' learning experience through construction of models of future vehicles and programming. The participation of two students in the Cars of Tomorrow Design Competition has also provided some direction for next year's programme.

Although XS1.0 involved considerable financial commitment, it was effective in improving learning motivation, as reflected by students' hard work and dedication. Many of them chose to stay behind after school to work in the Creativity Zone, even though that would mean skipping dinner and going to bed late. However, the tight senior secondary curriculum, coupled with the scheduled activities under the curriculum of individual subjects, rendered it difficult to create ample opportunities for cross-curricular collaboration and in turn limited the scope of the project. In the coming year, teachers of different subjects could be engaged to a greater extent in conceiving the programmes.

Look to the Future: The Next Generation Vehicle 2.0

In the course of the project, many teachers realised that only through continuous professional development could they keep up with the lightning pace of technology innovation. I, for one, have completed several relevant teacher development programmes covering topics like brain-computer interface technology, artificial intelligence technology, machine learning and deep learning. In the future, I hope to incorporate what I have learnt into the programmes in order to introduce such knowledge and technology to students and inspire their vision for the future.

The programmes under the project were conducted on a pilot basis and there were quite a few shortcomings. For instance, while the programmes involved a lot of programming work, many students had not come across programming in previous learning and they found it challenging to catch up. However, I am confident that the project can be a good example of phenomenon-based learning and entrepreneurship education as long as teachers and experts of relevant fields work together to seek improvement through research and experimentation. “The Next Generation Vehicle 2.0”, the second edition of the project, will be launched in 2019-20.

Making a Difference in Our Neighbourhood

Natasha TSANG Pui-ki
Tak Oi Secondary School

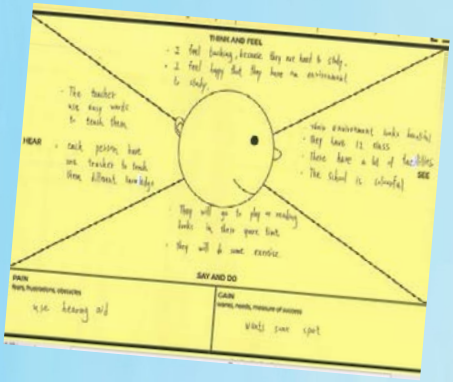
Why? – 'Creating a Platform for the Interdisciplinary Initiative'

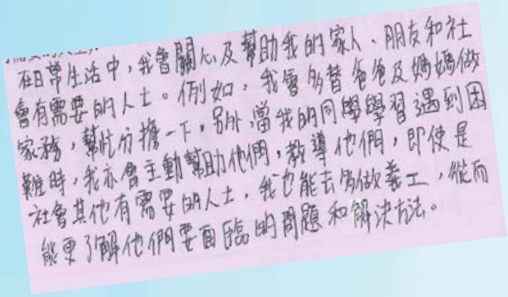
As a Catholic EMI girls' school, we do not only aim to enlighten our girls to strive for academic excellence and to develop their unique potential, but also embrace the call to nurture their positive qualities and values. It is our hope that they will contribute to the common good of the universe.

My initiative was set out to provide a meaningful, authentic and practical learning platform for students to develop essential learning skills and attitudes in the 21st century. It echoed the key elements of the most updated secondary curriculum and development. It was expected that students' sense of responsibility, creativity and collaboration skills would be enhanced through this initiative. It was also expected that students would be inspired and become more dedicated in contributing to the community.

How? – 'Design Thinking and Community Serving'

The initiative was composed of a series of activities and sessions held from September 2018 to February 2019. All S2 students were expected to learn about design thinking and serve two groups of stakeholders in the community. From designing the learning and teaching materials to delivering the materials and conducting the activities, teachers made references to the Design Thinking Package from Stanford University.

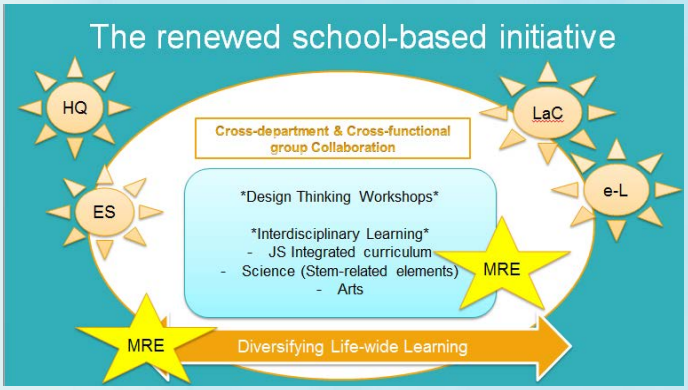


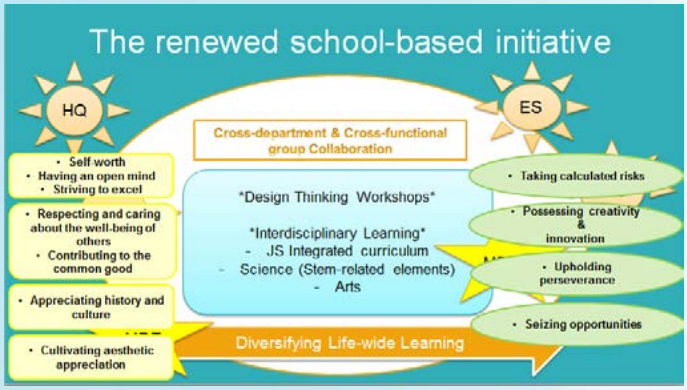


In implementing the initiative, different teams and subject departments collaborated with each other. The Learning Management Team acted as a coordinator and organised a series of school-based workshops on design thinking with knowledge and skills of different subjects incorporated. Students were provided with ample opportunities to explore their potential and acquire new knowledge and skills. In the process, they were required to develop creativity and innovation, seize opportunities, take calculated risks and uphold perseverance.

What modifications have been made?

To better cultivate in students important humanistic qualities and entrepreneurial spirit, the initiative was revised to focus more on enhancing students' 21st century skills and values cultivation, such as collaboration, critical thinking/problem solving, creativity, scientific literacy and some character qualities like initiative and persistence as well as social awareness. Only students who were more able and interested in STEM elements were encouraged to design their products with application of relevant skills and knowledge.





The Renewed School-based Initiative

Furthermore, the initiative was also conducted in the Activity Afternoon Sessions to reduce the disturbance to subject curriculum and ease the problem of lesson clashes. In these Sessions, subject teachers concerned were invited to facilitate the learning activities or workshops with the application of relevant subject knowledge and skills.

For example, Science teachers underwent different scientific investigation with the students concerned when making the 'invisible ink' and 'aroma flower'. This further extended students' interests and learning experiences in the subject. This also provided students more autonomy to explore and investigate relevant issues on their own.

What objectives have been achieved?

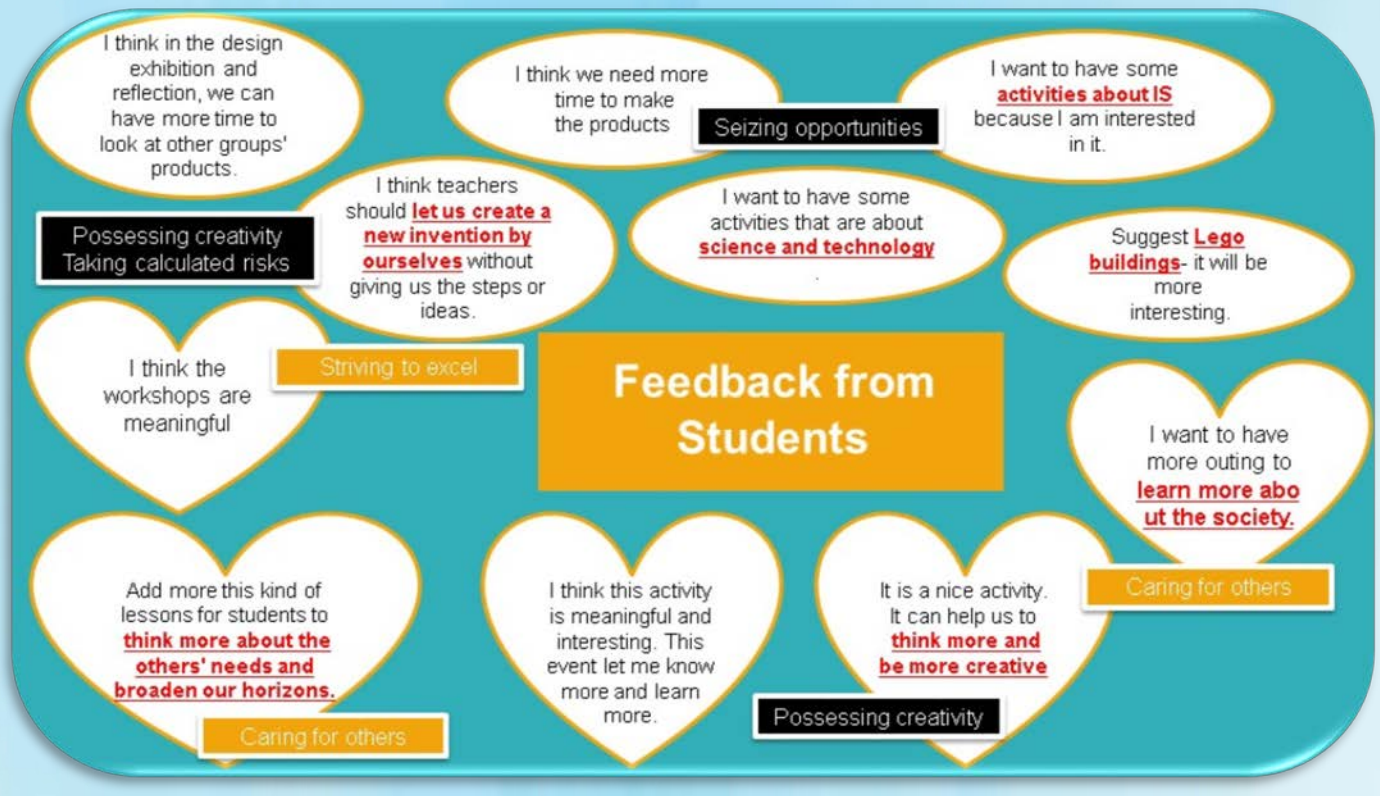
The introduction of interdisciplinary learning experience has achieved quite a lot of the objectives as planned.

By learning to consider the thoughts and feelings of those they would like to help, students have developed a stronger sense of empathy. Students have also discovered that, by making good use of their creativity and acquired knowledge or skills, they could think of many possible solutions to a problem.

This initiative was effective in catering for learning diversity as well as developing students' potential and uniqueness. For instance, students who did not perform very well academically were provided an opportunity to exhibit their potential in design and creativity.

Apart from that, the feedback received from teachers and students was very positive. They even gave constructive suggestions to further develop the school-based initiative to

another level. For example, some students suggested giving higher autonomy for them to define the problem and product in the process of learning. Some STEM and language teachers took the initiative to ask for further collaboration and curriculum mapping in the coming year. All of these proved that the initiative has achieved its aim of creating a meaningful, authentic and practical learning platform for students to acquire knowledge and skills as well as develop positive values.



IMPACT on Me

Walking down the memory lane of my participation in the 'i-Journey' Scheme and the implementation of my school-based initiative, I have further affirmed my belief that education has to be future-oriented – equipping students with skills, knowledge and attitudes to face the ever-changing world and challenges in the future.

Similar to phenomenon-based learning in Finland, this interdisciplinary initiative presents a feasible approach to enhance students' transversal skills through collaboration among different subjects. Although both teachers and students had to overcome a lot of challenges during the preparation and implementation processes, the effort was worth it. With the creation of the interconnected and engaging learning platform, all our hard work has paid off. Teachers who are willing to initiate changes are indeed good role models for students. It takes perseverance and a willingness to take calculated risks to make a difference for the common good – and these sum up the gist of entrepreneurial spirit and professionalism.

i-CARE

Priscilla WONG Ka-po
St. Stephen's Girls' College

iNQUIRE

Like most other participants, I set off the ***'i-Journey'*** with a wish to unlock the secrets of the success of Finnish education. I know that changes may not happen overnight, but to start with small and practical ones should be our endeavor. I was so determined to learn about the Finns' good practices that can also be applied in our own classrooms.

iNSPIRE

The Finnish teachers preferred formative assessments to summative ones, as they believe that the learning process is more important than the grades students could attain. They also firmly believe that the best mode of learning is by doing. That is why experiential and inter-disciplinary learning is highly valued in Finland.

iMPACT

The ***'i-Journey'*** programme has inspired me to reflect on my roles as a teacher and as a person. I feel the urge to put experiential learning, self-directed learning, and entrepreneurship education into practice, so that my students could be given every opportunity to choose to study what they are interested in.

Why? – 'i-CARE'

Through the 'i-Journey' Scheme, I had the opportunity to participate in overseas study in Finland. During my learning journey, I acquired new insights of the philosophy of experiential and phenomenon-based learning. This has inspired me to explore new initiatives and pedagogies that can be effectively applied in Hong Kong school classrooms to enhance student learning. I am also curious about the

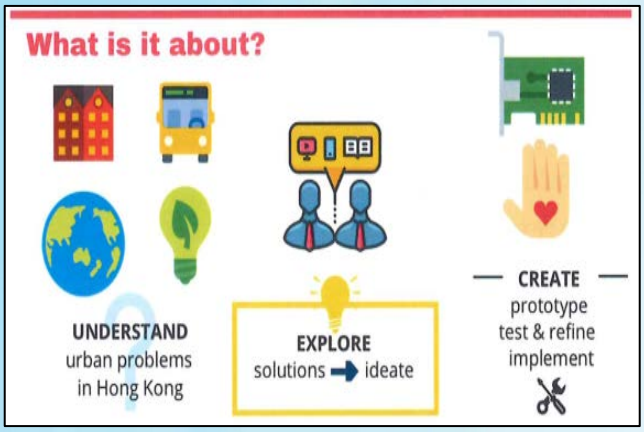
effectiveness of dynamic environment in teaching and learning.

As students in our school enjoy diversified learning experiences, an i-CARE project was developed to promote an interdisciplinary approach to learning and foster F4 Geography students' all-round development. This project focused on students' development of the following:

1. **Subject Knowledge** – applying prior knowledge from interdisciplinary perspectives, taking the initiative to explore new knowledge through self-directed learning
2. **Skills** – adopting self-directed learning strategies and demonstrating various transversal competencies, such as digital competences
3. **Values** – enhancing awareness of social issues, developing a sense of empathy and compassion and taking up social responsibility
4. **Attitudes** – maintaining a positive attitude even in times of difficulties, and developing reflection skills to enhance understanding of own strengths and limitations

What? – 'i-CARE'

In the i-CARE project, students were tasked with exploring urban problems in their neighborhood and suggesting practical solutions. In groups, students created a prototype model to help local residents tackle problems encountered in their daily lives. To make a prototype device, students brainstormed solutions following the design thinking process. After their prototype devices were created, students pitched their ideas. In the process, students were immersed in experiential learning activities, such as participating in field trips and creating VR tours.



How? – How was 'i-CARE' implemented?

A total of 49 F4 students participated in this project from November 2018 to May 2019. They explored the topic "Building a sustainable city" through different activities and tasks.

1. Conducting Research on Urban Problems

Students worked in groups to examine various urban problems in town. They did site visits to identify and explore the urban problems. During their site visits, they recorded 360° videos and took images for creating online virtual tours. After that, students used the footage and images to create VR tours to present their findings on the different urban problems identified.

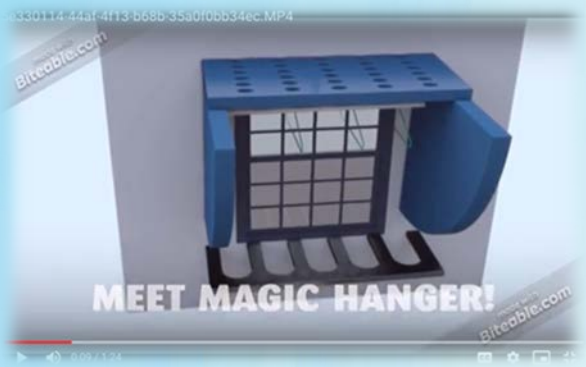
2. Attending Workshops on Design Thinking to Work Out a Solution

Adopting the design thinking process, students explored the best solution to the urban problem(s) identified. They learned how to formulate an appropriate problem statement with the proposed solution.

They also learned to understand the needs of a target group affected by an urban problem. They tried to think of as many possible solutions as they could in order to come up with an innovative and feasible solution in the form of a prototype.

3. Presenting Findings

Students explained their prototype concepts using a written proposal and a short video. They could use role play, animation or model simulation to precisely explain their findings and concepts in tackling the urban problems identified.



Based on the feedback provided for their initial written proposals and videos, students started to "ideate" their projects – to create prototype models. Each group attended two consultation sessions from late March onwards and received technical support for the making of their models.

4. Pitching

Each group was given the assessment rubrics beforehand. On the pitching day, each group introduced their prototype concepts and a short video, followed by the demonstration of the operation of their prototype model. Some students played the role of assessors. They could ask questions in the Q&A session and could be invited to operate the prototype models.

What were the challenges and how were they dealt with?

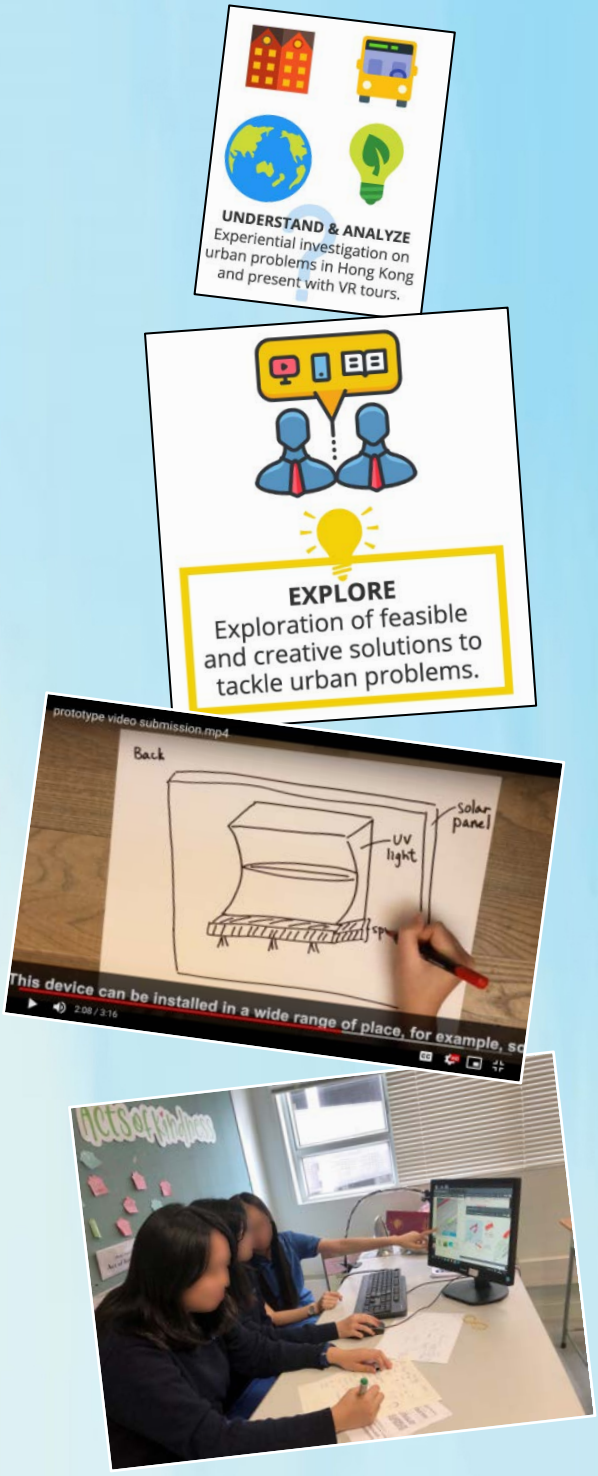
1. Constraints of Time-table and Teaching Schedule

Since there were two periods of Form 4 Geography lessons per week, it was hard to spend all the sessions on the i-CARE project in view of the teaching schedule. With such limitation, an online learning management platform (google classroom) was used to maximise the interaction between teachers and students. One advantage of this arrangement was the fostering of students' self-directed learning. Students learned to make good use of the "virtual learning commons" to get inspired or to inspire others. Besides, this helped build a positive learning culture for students to share and exchange ideas.

2. Technical Problems

Many of the devices created were installed with sensors, micro:bit, electric parts, or included a mobile app in the operation. Students turned out having to spend longer time for testing and fine-

tuning their prototype models. To allow more time for students to ensure smooth operation of their models and polish their projects, the duration for prototype model making was extended through early April. In the process of testing and fine-tuning their models, students learned to solve different technical problems. They could acquire new skills and techniques, such as coding in app writing, choosing sensors and basic coding using AppInventor.



What competences have students developed?

In completing their projects, students could develop interdisciplinary competence by integrating knowledge from different subjects to examine urban problems faced by people from different walks of life. As shown by the research data, students had strong recognition of the interdisciplinary approach initiated by the i-CARE project. They also liked the experiential learning approach adopted. The majority of the F4 Geography students believed that the i-CARE project could stimulate their interest in examining urban problems.

After completing the project, students had become more confident in working in groups and exchanging ideas with others. Their written and conversational communication skills were also improved. They were less afraid of making mistakes as they had learnt about the process of trial and error. They had come to understand this as a method to continue making improvement in their work.

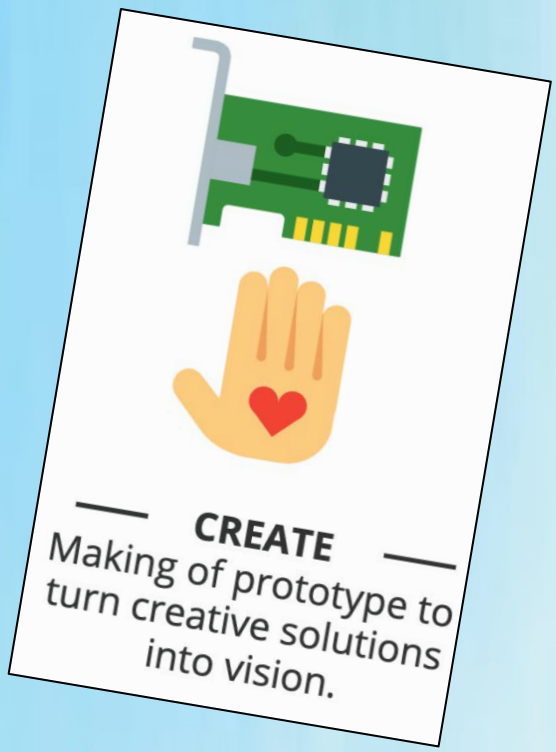
Moreover, students had demonstrated their digital competence when working on the project, such as using the online learning management platform, creating VR tours, shooting and editing videos and using presentation tools. They also considered that the project had encouraged them to try to use various sensors, devices and coding skills in creating mobile apps. It was the first time they experienced the “learning by doing” approach in the construction of a prototype model. This enabled them to become more confident in using new technology.

What values have students realised?

Students became more aware of social issues and more capable of showing empathy towards the needy. For them, the project was a recognition of their own competence in applying their knowledge and skills to find solutions to improve the living conditions in the community. Many of them agreed that they had become more willing to take up social responsibility and had learned to become active citizens.

Conclusion

As a whole, this social innovation project was implemented successfully. As expected, students had created a prototype which could be used to tackle an urban problem. Besides, students had demonstrated their critical thinking, collaboration and communication skills when working with peers; their self-directed learning capabilities when creating online virtual tours; and their sense of empathy and compassion when exploring and identifying urban problems affecting the needy.



Application of Drones in Interdisciplinary Learning and Entrepreneurship Education

Richard YEUNG Chung-yiu
Carmel Holy Word Secondary School

iNQUIRE

I started the **'i-Journey'** with this question in mind: What is "Phenomenon Based Learning"? To me, it would be interesting to walk into the Finnish classroom to observe how teachers guide students' learning through this innovative pedagogical approach!

iNSPIRE

It is interesting to discover that the main difference between Finland's and Hong Kong's teaching is not the methods, but the mindset and philosophy of education. Teachers in Finland have full trust in their students' potentials and capabilities.

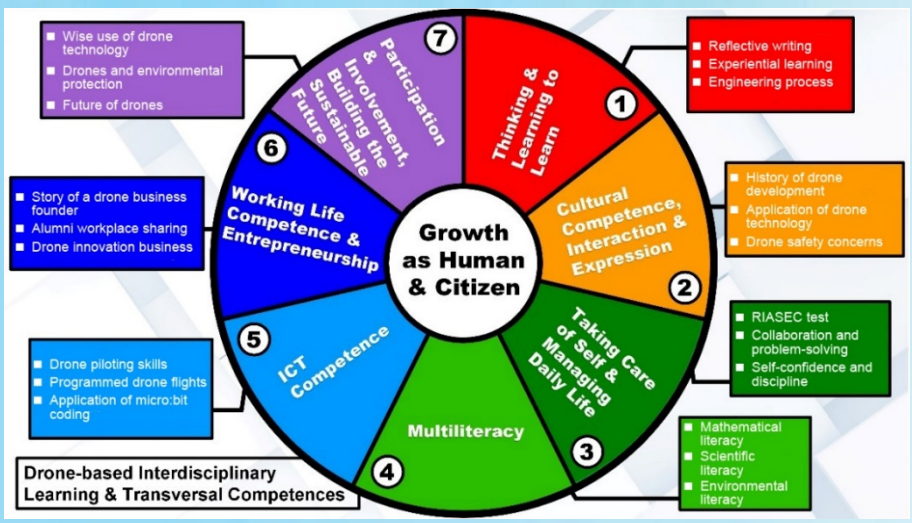
iMPACT

I started to realize that holistic real-world phenomena can provide a good starting point for learning, during which information and skills are studied in a real context by crossing the boundaries among subjects. The eye-opening learning journey to Finland has empowered me to refine and launch the drone-based interdisciplinary learning programme which allowed my students to learn practical and abstract knowledge as well as skills such as problem-solving and communication skills in off-the-ground ways.

Learning about the Characteristics of Finnish Education

To better equip children with the 21st century skills, Finland embarked on an education reform in 2016, advocating phenomenon-based learning and the cultivation of young people's transversal competences, which include:

(1) Thinking and Learning to Learn
(2) Cultural Competence, Interaction and Expression
(3) Taking Care of Self and Managing Daily Life
(4) Multiliteracy
(5) Information and Communication Technology Competence
(6) Working Life Competence and Entrepreneurship
(7) Participation and Involvement, Building the sustainable future



I was honoured to be chosen for a five-week study trip to Helsinki and Jyväskylä, Finland between April and June 2018. Through theory classes, professional exchanges, and lesson observations during attachment, I was able to survey the characteristics of Finnish education and study "interdisciplinary learning and exploratory and innovative education". Upon returning to Hong Kong, I developed a thematic interdisciplinary learning programme by integrating local academic subjects with contextual learning, using the Finnish curriculum framework as a reference.

Developing an Interdisciplinary Drone Programme

Thanks to the enlightenment of prominent Finnish teaching and research professor Heikkinen HANNU and local experienced instructors, I have developed with fellow teachers an interdisciplinary programme on the back of drone technology. The programme not only linked to several Key Learning Areas (KLAs), including Science, Mathematics, Information Technology and Geography, but also included elements of life planning and entrepreneurship education. While enhancing students' STEM literacy and their ability to apply knowledge, it also aimed at teaching students to have the patience to resolve problems and the courage to face failure, so that they could undertake the mission of improving our life by harnessing technology to good purpose ethically.

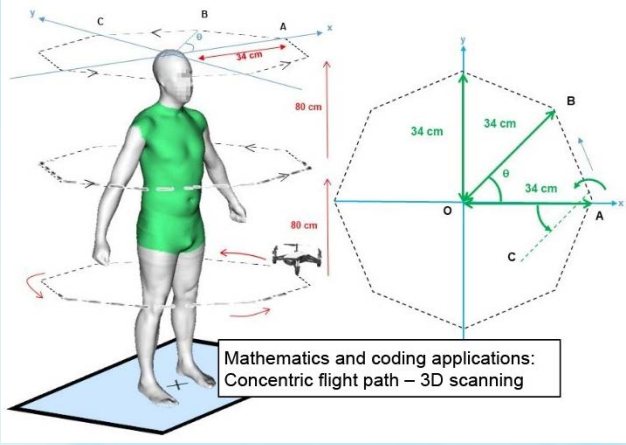
Planning and Implementation of the Interdisciplinary Programme

The programme ran between October 2018 and April 2019 and targeted Secondary Three and Secondary Four students. Centred around junior secondary Mathematics and Science, it comprised two phases, namely Knowledge Developing Phase and Engineering Problem-solving Phase. Phase One consisted of 10 lessons covering six experiential learning modules for a total of 36 hours. Based on Bloom's taxonomy of cognitive domain, the

modules were designed to achieve three levels of objectives:

1. Remembering and Understanding
   (a) Introduction to drone technology
   (b) Drone piloting knowledge and skills
2. Applying and Analyzing
   (c) Drones and the application of trigonometry
   (d) Drone coding and engineering design
3. Evaluating and Creating
   (e) Drones and environmental science
   (f) Future application of drones

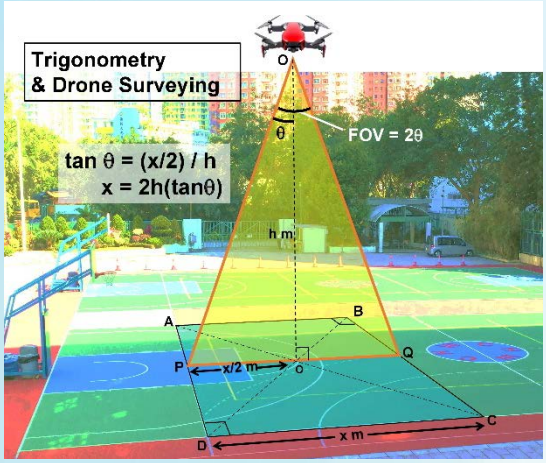
To facilitate knowledge management, a dedicated website Learning LogBook was set up to capture such information as curriculum outline, learning materials and assignments. Moreover, to tie in with various interdisciplinary themes, alumni working in related fields (e.g. aerophysics, surveying and valuation, stream water analysis, market strategising, etc.) were invited to share career insights, thus bridging the gap between classroom learning and workplace experience.



For the purpose of summative assessment by the end of Phase One, students had to apply the knowledge acquired so far as well as their creativity to present an entrepreneurship proposal on benefitting the society with drone technology in Lesson 10. The proposal should leverage on the advantages of drone technology while striking a balance between innovation, feasibility and safety. Students would give a video presentation to illustrate their concepts and take questions from a panel of guest judges. Proposed uses of drone technology ran the gamut from dispatching drugs to inspecting cross-strait bridges and suspension rails, cleaning and inspecting glass curtain walls, conducting tree surveys, monitoring tree protection measures, bird conservation, etc.

Developing a Drone-assisted Surface Water Sampling System

Phase Two of the programme consisted of a series of engineering tasks and was 12 hours long. It required students to design a drone-assisted surface water sampling system using the knowledge, techniques and experience that they had acquired in Phase One, in combination with micro:bit coding and servo motor design skills. The system was expected to provide data conducive to marine conservation and sustainability of biodiversity. After rounds of patching and payload testing, the system passed a test run over the school pond, and successfully collected water samples from Clear Water Bay, Sai Kung and Lam Tsuen River, Tai Po. Measuring such water samples' hardness, level of total dissolved solids and nitrate nitrogen content would then reveal the extent of pollution in the waterbodies concerned.



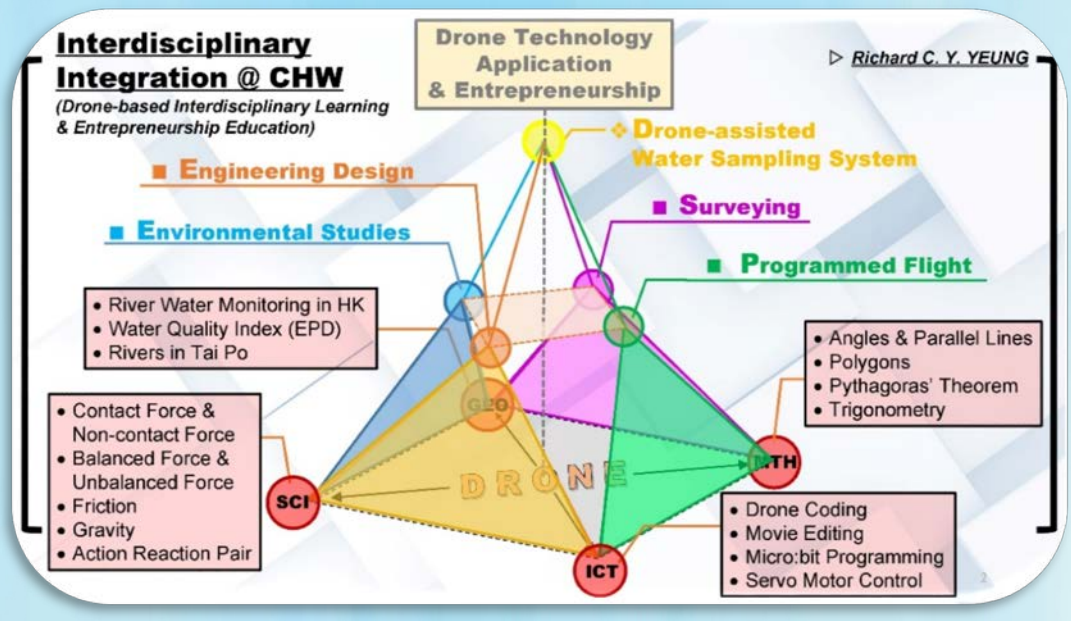
Reflection: Challenges and Inspirations

1. Interdisciplinary teachers?

Interdisciplinary learning is implemented mostly through inter-departmental collaboration. However, if teachers themselves do not possess rich experience in interdisciplinary learning, it is indeed not easy for them to develop students' interdisciplinary competencies. Teachers designing interdisciplinary curricula should first test the curriculum contents from a learner's perspective to identify possible difficulties by themselves. This ascertains the links between relevant subjects and thus facilitates effective curriculum mapping and cross-KLA collaboration.

2. Effective collaborative learning?

Teachers should have a thorough understanding of the strengths and weaknesses of individual students so as to help them position themselves in a group and find their way to contribute. The RIASEC test enables students to identify their aptitude. To achieve more effective collaborative learning, teachers can use the relevant data to group students in such a way that ensures a more reasonable combination of abilities and hence better division of responsibilities and cooperation.



3. Life planning?

Given that most teachers have limited knowledge of the world of work, they may not be able to satisfactorily explain to their students the relevance of "hard knowledge" and "soft skills" to career development. Therefore, teachers should take advantage of alumni resources by, for example, inviting graduates working in different sectors to hold career sharing sessions to widen students' horizons, enhance their learning motivation and instill in them positive values as a means to promote life planning and whole-person development.

4. Self-directed learning?

One of the strategies of promoting self-directed learning is to empower students to take ownership of their own learning. Setting up the Learning LogBook platform enables students to showcase their group and individual assignments. While fostering a sense of ownership, this also enables students to learn from each other and increases everyone's volume of knowledge by encouraging students to consolidate their learning and share knowledge.

Programme A(2) – Catering for Students with Special Educational Needs

Mid April – Mid June 2018

Melbourne, Australia

Administered by the Education Bureau, the Programme consisted of both local and overseas components. While the local part of the programme was supported by Department of Education Studies, The Hong Kong Baptist University, the overseas customised programme was conducted by the School of Education (SoE), Deakin University.

The customised overseas programme aimed to enable participants to

(a) acquire knowledge about the latest policies and effective measures in delivering special and inclusive education in Australia;

(b) learn about providing system support and supplemental instruction for students with SEN in Australian schools, which could shed light on Hong Kong's 3-Tier Support Model in catering for students with SEN;

(c) gather knowledge and strategies for the evidence-based practices deployed by the effective Australian schools in supporting students with SEN, especially high-incidence disabilities such as Dyslexia, Attention Deficit / Hyperactivity Disorder (AD/HD), Autism Spectrum Disorders, and Speech and Language Impairment;

(d) learn about successful education transition programmes (early childhood to primary, primary to secondary, secondary to post-school) for students with SEN in Australia;

(e) integrate knowledge and reflect on the strategies acquired from structured learning and school attachment to engage in a school-based initiative / research; and

(f) develop teacher leadership through sharing learning outcome in Professional Learning Communities (PLCs) and disseminating good practices, with a view to inspiring paradigm shifts in inclusive education.

Promoting Assessment for Learning in Vocabulary Learning through Identifying Students' Learning Needs from Data Analysis of Online Quizzes

Rebecca AU Siu-mui
Fortress Hill Methodist Secondary School

iNQUIRE

Knowing that Australia adopts an inclusive approach when dealing with special needs education, I gave myself a mission to find out the differences in the actual practices towards SEN education between Hong Kong and Australia. I was particularly interested in the degree to which inclusion is practiced and how students with SEN learn in the Australian classrooms.

iNSPIRE

We teachers in Hong Kong typically spend most of the class time on teaching. What surprised me most was how teachers in Australia just do the opposite: Spending only little time introducing the topic and leaving more time for students to learn and explore on their own. From what I've observed, by doing so, students are well allowed to learn at their own pace while teachers only serve as a facilitator.

iMPACT

One thing I've learnt is to stop looking at the students' disabilities but to try to embrace these disabilities of theirs and guide them to learn utilizing their strengths. This "strength-based model" is a very positive teaching model that shakes our fundamental belief in the inclusive approach to SEN education.

Background of the Research Study

With the popularity of IT in Education, teachers have been more aware of the use of online e-Learning resources to enhance students' learning. One of the important approaches to enhance students' learning, as revealed by recent research, is through assessment.

Assessment for Learning is an approach that uses formative assessment in the classroom to inform learning and promote achievement (Berry, 2013; Mc Sweeney, 2012). It also provides practical information for teachers on where individual students are in their learning, thus enabling teachers to meet the needs of students (Black & William, 1998). The obtained assessment information can inform how effectively the students have been taught and consequently assist teachers in improving their learning.

Online-learning platform - "Kahoot"

This study was carried out in a small co-educational secondary school which mainly caters for students with special educational needs. The objective of this study is to promote Assessment for Learning in vocabulary learning through e-Learning.

Implementation of the Research Study

To identify students' learning needs by making use of data, this study used student and teacher questionnaires, students' performance, interviews and teacher's observations as the research instruments. Nine Secondary Five students with special educational needs were invited to participate in this study. The English level of these selected students was amongst the weakest. In order to promote their confidence in vocabulary learning, a popular game-based learning platform, *Kahoot*, was used for online assessment (quizzes) as it was considered a fun and non-threatening tool. Two cycles of implementation were arranged for the school-based research and one or two online quizzes were prepared for the students after they had finished studying each module.

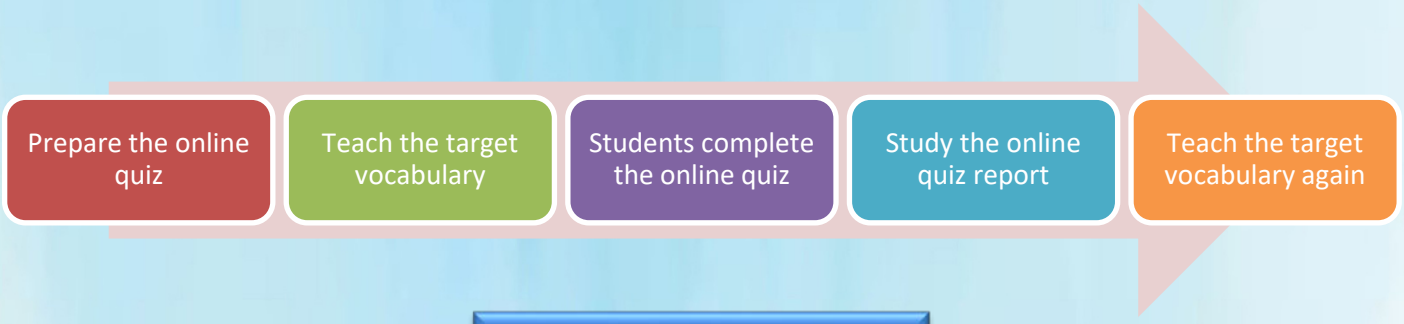
The First Cycle

In order to integrate the additional online quizzes and vocabulary learning activities into the curriculum, the Secondary Five English teaching plan was modified. The first online quiz regarding the types of shopping for the first module ("Working in a Shop") was prepared. First, the researcher prepared the online quiz. Second, she spent one lesson to teach the target vocabulary. Third, she asked the students to complete the online quiz in class the next day. Fourth, she studied the Kahoot report on students' performance. Fifth, she spent one more lesson teaching the target vocabulary again with modified teaching activities based on the analysis of students' performance in the online quiz.

Results and Feedback Received in the First Cycle

For the first quiz, the passing rate in the vocabulary section (different types of shops) is 90%, while the passing rate of last year's students in the same vocabulary section was only 45%. After the first trial, another two online quizzes, one on the types of pollution and another on the types of environments for the second module ("Nature and Environments") were prepared. The passing rates in the two vocabulary sections in the First-term Examination were 67% and 33% respectively, while the passing rates of last year's students in the same vocabulary sections were 21% and 32% respectively.

In evaluating the results from the first cycle, some teachers raised that more thoughts should be given to when would be the best timing to design the online quizzes. It was agreed that while it would mean a tighter schedule for the teachers, the design of the online quizzes should come after the initial teaching of the target vocabulary so that the quizzes could be more reflective of the students' learning progress.



Schedule of the first cycle

The Second Cycle

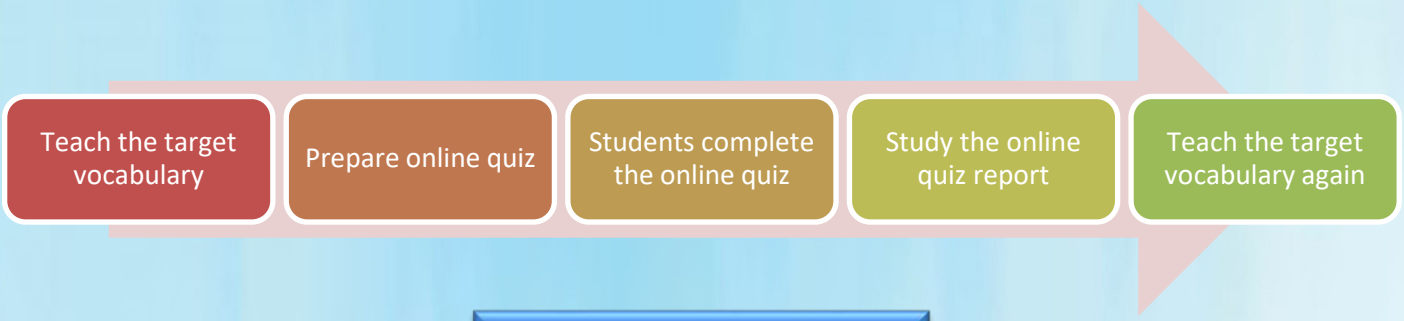
With the experience gained in the first cycle, the approach of designing online quizzes was modified. The quizzes would only be designed after the teaching of the target vocabulary. This modification was to enable teachers to better understand students' learning difficulties before preparing more online quizzes to help them learn the vocabulary in the second term.

Results and Feedback Received at the Second Cycle

Two online quizzes for the first module ("Learning English through Drama") were prepared. The first online quiz was on the setting of a scene and the second one was on emotions and feeling. The passing rates in these two vocabulary sections of the Uniform Test were 75% and 75% respectively. The passing rates of last year's students in the same vocabulary sections were 55% and 75% respectively.

After conducting the first two quizzes, two more online quizzes for the second module ("Planning a Holiday") were conducted. One of the quizzes was on planning a holiday and the other was on the module "In a Play". The passing rates in the vocabulary sections in the Second-term Examination were 75% and 62.5% respectively while the passing rates of last year's students in the same vocabulary sections were 60% and 55% respectively.

At last, the students were invited to complete the student questionnaires. Four students were interviewed and asked for their feedback about the study. The progress was finally reported to the panel members. The panel members were pleased to see the positive results in students' learning and expressed that they would like to apply online quizzes as Assessment for Learning tool for their students next year.



Schedule of the second cycle

Positive Changes to Teaching and Learning

Before the implementation of this project, teachers relied mostly on the summative assessments to conclude students' learning effectiveness. At that stage, little could be done to remedy any unsatisfactory learning. With the use of these online quizzes as Assessment for Learning amidst the teaching process, teachers have become more informed of their students' needs and weaknesses, which in turn would allow them to further adjust their teaching plans. Knowing more about the students' mastery (or lack of mastery) over the targeted vocabulary through the online quizzes, teachers were then urged to reformulate their teaching strategies, e.g. by making use of more interactive and participatory activities, to enhance learning among the students.

As a result of these interventions, students generally performed better in the vocabulary sections in the Uniform Tests and Examinations throughout the year. They did not only show improvement in their ultimate assessment performance, but also developed a positive learning attitude. The use of such online quizzes as Assessment for Learning tools has seemed to work effectively as students have become more motivated, more confident and more actively engaged in their learning despite being frequently troubled by their learning disabilities.

Way Forward

The main benefit of this school-based research was that it has enabled teachers to grasp students' learning needs in a more timely manner. Teachers have also been prompted to think further about diversifying their pedagogical approaches when they have to swiftly adjust their teaching to address students' needs.

Although teachers in our school tend to face a very tight schedule and heavy workload given our student profiles, this idea of Assessment for Learning should still be considered a worthwhile approach for the whole school to adopt, for this would allow teachers to perceive students' learning from very different perspectives. Also it is advantageous when the school operates as a learning organisation and develop a shared understanding of pedagogical practice and plan for progression in pedagogy as well as content.

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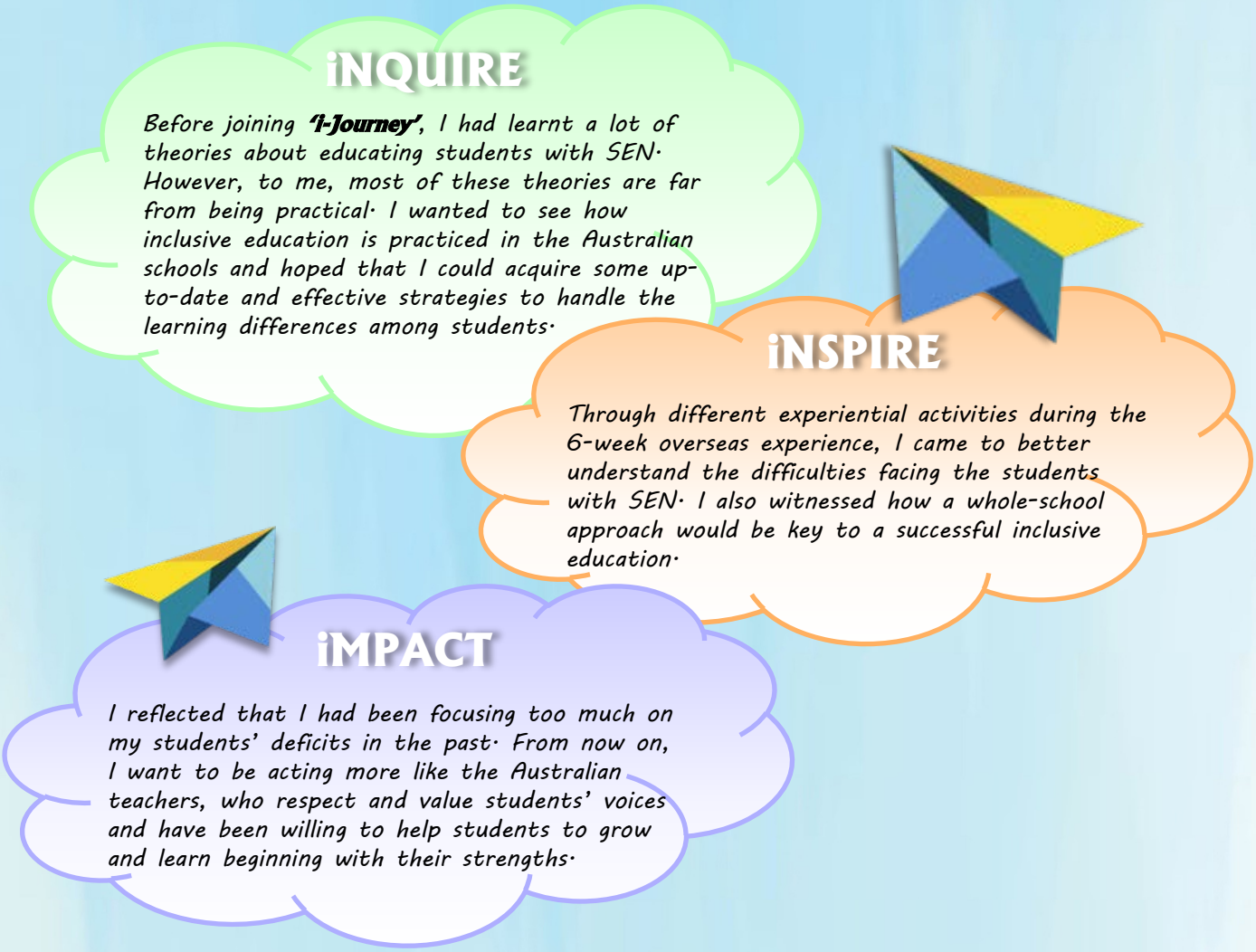
Exploring the Use of Strength-based Approach in Catering the Learning of Students with Special Educational Needs Inside Classroom

Mancy CHAN
Pui Tak Canossian College



Background of the Research Study

In order to help the students with special education needs (SEN) in learning, particularly in boosting their confidence and enabling them to perform better in their studies, the strength-based approach was adopted in a senior form elective subject.

The strength-based approach aims to encourage students to use their strengths or abilities to tackle the issues at school (Rawana, Latimer, Whitley & Probizansk, 2009). By strengths, they do not merely cover the traditional academic skills but also

different aspects including social, emotional, cognitive and logical, etc. It is hoped that students can learn better by developing their strengths and abilities to the fullest.

The main objective of this research is to examine the effectiveness of the strength-based approach in teaching.

Research Questions

To achieve the objective of this study, two research questions have been set: (1) How can teachers make use of the strength-based approach in classroom teaching? (2) How do students' strengths profiles facilitate teachers to develop a strength-based approach in the classroom teaching and improve their teaching practices?

Methodology

Two students with SEN studying an elective were invited to be the target students. Student profile, strength-based lesson preparation checklist, lesson observation form and lesson observation questionnaire, as well as teachers' reflection journals were developed and used as the measurement instruments for the study.

To examine the data from different perspectives and avoid being subjective, triangulation was employed. Aside from my personal observation, my school SENCO (SEN coordinator) was invited to conduct lesson observation to provide more analytical information.

Accordingly, different qualitative data were collected. They included data from strengths profiles prepared by students, video recordings of my lessons, lesson observation questionnaires and forms completed by two target students, the researcher and my school SENCO, and interview(s) with my school SENCO.

My Inspiration of This Study: *Wall of Strengths* in Staff Room of an Australian School

Key Findings

First, the whole class including the two target students liked to fill in the strengths profiles and even provided additional information in the profiles. All the information was very useful for planning classroom activities for the whole class and especially for the target students. However, when planning classroom activities, it was found that some strengths on the student profiles, such as "trustworthy and honest" ("可被信任和誠實的") and "enjoy using social media (e.g. Instagram)" ("喜歡社交媒體 (例如Instagram)" could not be easily demonstrated in the classroom.

Student Profile: My instagram

Second, by comparing my lesson observation records and the two target students' records, the results indicated that the two students had more strengths in common with me than the comparison between mine and my school SENCO's. It was probably caused by the different experience of people inside the classroom and the observer. The short answers written by the target students showed that they could find the relationship between the strengths and classroom activities. On the other hand, my school SENCO did not mention concretely on the relationship in the interview or on the lesson observation form.

Third, through the comparison of the lesson observation forms between mine and my school SENCO, the results on the Inclusion Teaching Checklist, which was the first part of the observation form, were similar. In contrast, the discrepancy between understanding of strengths-based approach could be clearly shown.

Implications of the Study

Strengths profiles would be a good tool to gather information about students' learning styles and their strengths. It would also be a very good activity to be implemented on the first day of the school year. The profiles could give full descriptions of the learning characteristics of the whole class and individual students. Appropriate strength-based teaching strategies and classroom activities could be designed by referring to the information on the strengths profiles.

The comparison of the results of the lesson observation forms indicated that training on strength-based approach for teachers should be provided so that teachers' understanding of strength-based approach could be aligned. Although it is quite time-consuming for teachers to complete reflective writing after each lesson, reflective writing would be helpful for the development of strength-based approach in classroom.

Conclusion and Way Forward

The whole process of using the strength-based approach in classrooms was student-oriented. To sustain the impact of the study, the strength-based approach in classrooms can be further refined. In order to help students recognise their own strengths and apply them in their daily lives, teachers should learn about their own strengths first and then apply their own strengths in learning the most effective educational methods. Teachers are suggested to use the tools including the same set of strengths profile, lesson preparation checklist and lesson observation form developed in the study to adopt strength-based approach in classrooms. For example, a wall of strengths could be created on a bulletin board to acknowledge students' strengths and encourage them to learn. On the other hand, teachers can keep a log book of strengths to record students' strengths and remind them of their own strengths consistently.

This will help teachers to select suitable helpers to perform different duties as well as let students believe that they are valued, and learn to appreciate others' strengths, so that a more inclusive culture in the classroom will be formed eventually.

Reference

- Rawana, E., Latimer, K., Whitley, J., & Probizansk, M. (2009). Strength-based classroom strategies for teachers. *Canadian Teacher Magazine*, 16-17.

An Implementation of Guidance Mentorship Scheme in Supporting Students with Emotional and/or Social Inclusion issue(s) at a Mainstream Secondary School in Hong Kong

Carmen CHUNG Yuen-lam
Munsang College (Hong Kong Island)

iNQUIRE

*The comprehensive inclusive education system in Australia appeals to me most. I hoped that I could take reference to their system and its practice when reviewing the student support system of my school after the **'i-Journey'**.*

iNSPIRE

"Every student can learn, but not on the same day or in the same way." – this quote from a lecture in the Deakin University has undoubtedly been the most inspirational to me. It reminds me of the importance of flexibility and taking students' emotions and diverse needs into account when teaching. I've learnt that having a sense of understanding and empathy before confrontation is always the best policy!

iMPACT

Upon the lectures and school attachment experiences, I have developed my own philosophy of inclusion: It all starts with an open, humble and equal mindset, accompanied by a display of genuine respect from the soul, heart, act and attitude towards people of different needs (PDN), then followed by showing comfort, acceptance and love for the PDNs. With all these, one would eventually shine and be the one to impact others!

A Scheme for Supporting Students with Emotional and/or Social Inclusion Issues

Over the past few years, there has been a sharp increase in the number of students with emotional and/or social inclusion issue(s) at schools in Hong Kong. With the aim of supporting students with emotional and/or social inclusion issues at a mainstream secondary school in Hong Kong, a Guidance Mentorship Scheme and a ten-month Guidance Mentorship Programme with different prevention and intervention activities were implemented. A research study that engaged youth mentors who were a few years older than the mentees was designed to examine the impact on the mentors and mentees during the mentoring process. This research study aimed at (1) examining how the implementation of guidance mentorship scheme in a secondary school context could have a positive impact on both participating parties (i.e. the mentors and mentees) and (2) exploring and assessing the outcomes of the implementation of guidance mentorship scheme upon the targeted youth with emotional and/or social inclusion issue(s) regardless of their socio-economic status.

Implementation

Three Secondary One students exhibiting emotional and/or social inclusion issue(s) at school were invited to be the mentees of the scheme while three Secondary Four students demonstrating personal traits of thoughtfulness, warm-heartedness, maturity and leadership were invited to be the mentors.

The research was carried out in three main stages, namely (1) the preparatory stage, (2) the programme execution stage and (3) the post-implementation stage.

Regarding the first phase - preparatory stage, the targeted mentors and mentees were identified and recruited by individual pre-group interview sessions. Learner profiles for both student mentors and mentees were established to facilitate identification of the targeted groups. After understanding the emotional and/or social needs of the student mentees, the strengths and capacity of the student guidance mentors, formal one-to-one matching between mentors and mentees was arranged.

The second phase – programme execution stage started with a kick-off ceremony. Both student guidance mentors and mentees were briefed clearly the objectives of the scheme so that they could understand thoroughly the roles and commitment expected for both parties. Each of the student guidance mentors was asked to meet her student mentee once every two weeks. They were asked to record the details of the meetings and reminders on a form for the teacher's follow up. To better provide support and backup for the mentors, four counselling workshops were offered to facilitate progress tracking, idea sharing and opinion exchange amongst different stakeholders.

Regarding the post-implementation stage, various evaluation approaches were adopted to better understand the overall growth and the impacts of the scheme on the participants. Examples of evaluation approaches adopted included interviews with student participants, phone calls to parents, and meetings with subject teachers and social workers. By the end of the ten-month Guidance Mentorship Scheme, the Celebration cum Closing Ceremony was held to provide positive reinforcement and an opportunity for the mentees to show appreciation for their mentors.

Results

(1) Positive Responses from Mentees and Mentors towards the Scheme

The mentees responded positively towards the Scheme. It was believed that both individualised mentoring mode (i.e. WhatsApp messaging and one-on-one chatting) and group mentoring mode (i.e. tea gathering and topic-based discussion) were considered to be effective means in the mentorship scheme. Through the individualised mode of mentoring, student mentees' sense of security was increased and a more in-depth relationship between the mentors and the mentees could be built. As for group mentoring, dynamic interactions among participants could be observed.

The mentors showed positive feedback towards the scheme. They understood more about the difficulties faced by the junior form students and developed the skills of coaching, especially in leading the two groups topic-based sharing sessions. Also, they were nurtured with a sense of belonging towards the school through participation in the scheme.

(2) Building Rapport between Two Parties

All of the mentees admitted that their mentors were not the first person they would approach in times of difficulties, but believed that they would seek their mentors' advice in future if needed. The above indicates that it takes time to build relationship, trust and rapport between both parties. It is understandable that students with emotional and/or social inclusion issue(s) normally take more time to build trust with others.

(3) Considerable Improvement of Mentees Academically and Emotionally

In terms of academic performance, it was found that all the mentees demonstrated considerable improvement in making an effort on their studies, and with significant improvement in academic results. They also demonstrated more stable emotion both at school and at home. It is believed that the mentees' improvement was attributed to the sense of trust and recognition infused throughout the programme.

Future Direction

In the future, more group social gatherings involving all participants of both parties can be arranged. Through informal social gatherings like teatime congregations, outings, dessert making, ball games, etc. where all participants of the scheme could get together, the sense of support, belonging and community among all the programme participants can be enhanced. With further refinement of the guidance mentorship programme, such as extending it to one and a half years and including both individualised and group mentoring modes, it will flourish with sparkling achievements and successes in the future.

Can the SEN Curriculum Development Team Facilitate Teachers' Professional Development?

Andy TUNG Sau-chung
China Holiness Church Living Spirit College

iNQUIRE

Realising Inclusive Education has been part of the educational discourse in Australia for almost two decades, one of my queries bringing along in my journey was to gather knowledge of inclusive education in Australia and to explore how the effective practices can be adapted in Hong Kong.

iNSPIRE

My consultation sessions at Deakin University were rewarding, especially the sessions when my tutor, Kim, introduced numerous amount of research on Community of Practice and shared with us about Reflective Teaching, a practice which she had been doing in Queensland for many years to know more about her students and her teaching.

iMPACT

My discussions with Kim on the setting up and the operation of Community of Practice have stimulated me greatly in forming a SEN Curriculum Development Team in my school to facilitate teachers' professional development.

Reason for Promoting SEN Curriculum Development Team

With an increasing number of students with special educational needs (SEN) in my school, teachers face a great challenge of learning diversity in the classes. However, most teachers mainly work individually. With this culture of individualism and conservatism, it would be difficult to foster collaboration amongst different colleagues, and thus the effect of improving teachers' teaching and students' learning would be far from satisfactory. Therefore, the idea of setting up a 'cross-disciplinary curriculum development team' was proposed to encourage teachers to work closely in a community to make decisions on curriculum development goals and instructional planning and to help colleagues explore new curriculum and ways of teaching.

The aim of carrying out this research was to promote the culture of 'Learning Study' among teachers in school and to eventually improve student learning by enhancing teachers' professional development. An interdisciplinary SEN Curriculum Development Team (SENCDT) was set up to improve collective teacher efficacy and help colleagues to explore new curriculum and ways of teaching.

Implementation of the School-based Initiative

The school-based initiative was implemented in four different stages, namely preparation stage, planning stage, implementation stage, as well as reflection stage.

During the preparation stage, the SEN Curriculum Development Team (SENCDT) was set up. It was headed by a SENCO (SEN Coordinator) and composed of the Vice Principal and the junior form teachers of 4 core subjects. The reasons for setting up the team, the objectives of the ad hoc committee and the professional development of teaching and learning were briefly introduced during the briefing session.

At the planning stage, the SENCDT functioned like a professional learning community (PLC). Collaborative activities including pre-lesson discussion, open lessons, classroom observations and after-lesson reflections were planned for the first and third semesters of the year.

At the implementation stage, teachers were encouraged to engage in conversations with trusted colleagues and keep updated about the teaching effectiveness of the new teaching methods. Interviews with team members and questionnaires collected from students were conducted during the first and third semesters.

After the implementation stage, the data collected were presented in the staff development day by the end of the year.

At the reflection stage, team members were asked to have post-lesson self-reflection. Feedback on the strengths and areas for further development was provided by other teachers based on their lesson observations.

Key Findings from Interviews

To find out the effectiveness of the SENCDT in enhancing teachers' professional development, such as their perception and expectation of the members on joining the SENCDT and the perception changes, semi-structured interviews and observations were employed to collect the data. Results showed that even though not all teachers shared the positive attitude towards SENCDT, the majority of the members had positive attitude towards the SENCDT and agreed that the development of the PLC in school should move from individual professionalism to collective professionalism. Members also believed that a culture that could facilitate practitioners to work interdependently rather than independently should be promoted.

Key Findings from Students' Questionnaires

To understand students' perception of the lessons, they were asked to finish a questionnaire after the lesson observation. Students in Class 1A all agreed that there were a lot of diversified classroom activities in English lessons. Students in Class 1B enjoyed the presentation session of the Chinese lessons while students in Class 1C enjoyed the lessons on "the Concept of Angle Sum of a Triangle" (三角形內角和) with paper-cutting demonstrations. The S5 students who were low-achievers recognized the Liberal Studies teacher's effort in teaching and were quite satisfied with the lessons. The relationship between students and teachers was improved. Overall speaking, at least 75% of students agreed that the classroom practice of the 10 observed lessons was helpful for their studies. This result was encouraging and was a driving force for the practice of SENCDT.

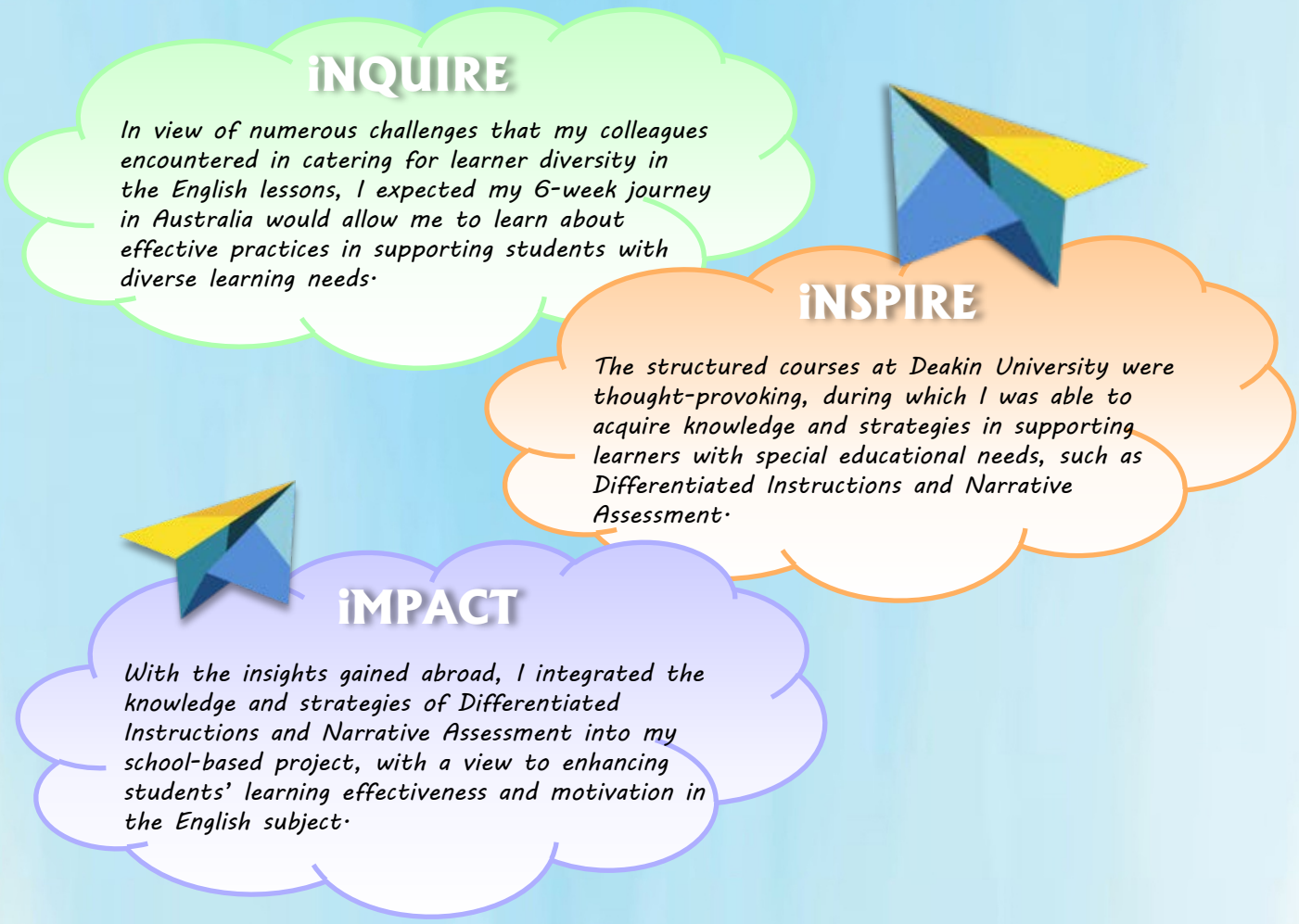
Conclusion and Future Direction

On the whole, the arrangement of SENCDT was helpful for teachers' professional development and effective in enhancing student learning. The formation of PLC also supported teachers' changes. This study can serve as a practical experience of teacher development at school. The SENCDT will therefore be retained in the following academic year. The four core subject teachers will remain in the team as a longitudinal methodology will be conducive to capturing changes in the process. It is hoped that the culture of PLC will be promoted not only in our school, but also in our community through the sharing of the positive impacts of the SENCDT practice.

SEN Curriculum Development Team (SENCDT) Meeting

Learn Effectively – for Students with Special Educational Needs (LESSEN)

Edith WONG Wing-fun
YOT Chan Wong Suk Fong Memorial Secondary School

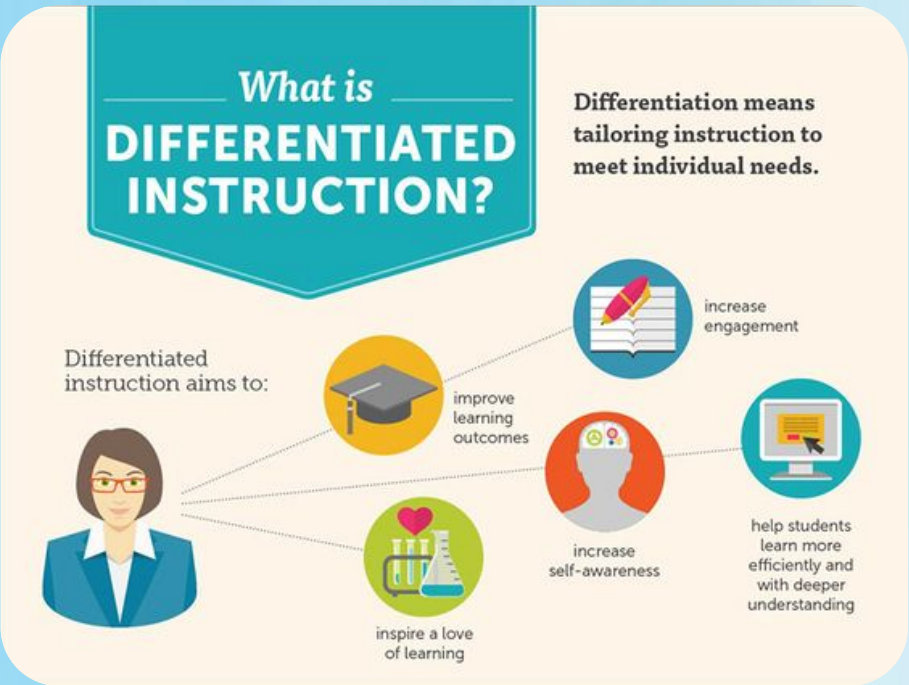


School Education Background

As we face a growing number of students diagnosed with different kinds of special educational needs (SEN) in our school, especially those with dyslexia, we teachers have found it increasingly challenging to accommodate students' learning needs. In the past decades, we worked very hard to tailor teaching materials of English subject for our students. However, only one set of materials that was designed for the middle band of students who formed the majority was adapted to cater for all students in the same classroom or even for the whole form. The actual needs of the students with different abilities could not be met.

Objective of the Study

This school-based initiative aimed to encourage students with SEN to focus their efforts on suitable and effective learning approaches to enhance learning effectiveness. It also aimed to increase students' motivation to learn English, especially those with unpleasant learning experience in the past. To achieve these, differentiated instructions were adopted as the new pedagogical framework. This would enable teachers to teach students of different abilities by using various methods so that each student could catch up with the learning pace. In light of the above, a research study has been designed to address the question: "How does the differentiated instruction with narrative assessment help students with special educational needs learn English effectively?"



How was the Study Carried Out?

To better understand the learning needs of each student, a subject-based diagnostic assessment was conducted at the very beginning of the school year focusing mainly on six key areas of their English learning. The results of each individual student were recorded. A student profile was prepared for each student based on the results of the subject-based diagnostic assessment, the results of the Attainment Test, as well as the SEN report. With the data collected, students were then divided into 6 groups based on their learning competences so that differentiated teaching goals and appropriate levels of difficulties could be set accordingly. In this way, differentiated instruction was introduced to different classes for the first time. Teachers could adapt the course contents, teaching materials and assessment methods to cater for different learning needs.

Apart from the above, two students with SEN were invited to participate in the narrative assessment programme. An individual learning plan was formed for both of them and at the end of each month they were invited to an individual interview where teachers discussed with them their learning goals. The teachers then compiled, based on the interview, a narrative assessment report, which also included the teachers' own observation regarding the students' learning progress and outcomes. The findings and the details of this narrative assessment were shared with the parents, their class teachers, other related subject teachers, and even the Principal.

Results and Implications

Generally speaking, the outcomes have met the objectives of the research. With differentiated instruction, the needs of learners with different abilities were better catered. The use of narrative assessment was also credited. Teachers found this practice constructive despite its time-consuming nature, as it did successfully reflect students' performances in aspects that could not be assessed in pen-and-paper assessments.

Positive Changes to the Students with SEN

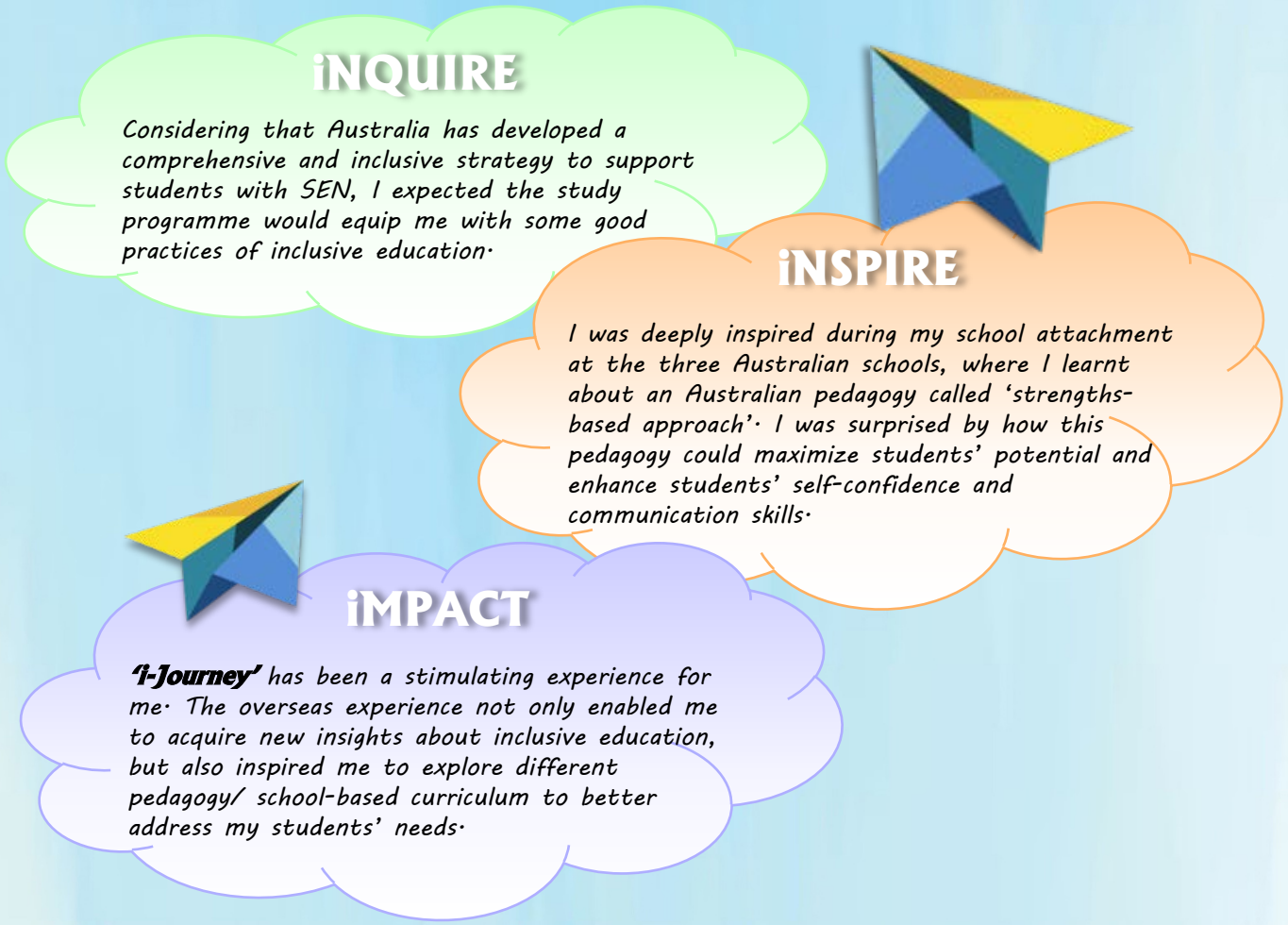
With the narrative assessment, the two students with SEN developed in them a sense of capability which has encouraged them to try something that they did not want to try before. The parents' perception of their children as 'a loser' was also removed. They welcomed conversations with teachers as they felt that teachers have become more positive towards their children. As teachers knew more about the students' performance in other areas, they were also encouraged to share this with the parents. This has helped the parents provide better care for their children and even encourage them to perform better.

Way Forward

The narrative assessment has worked well especially among the less motivated students, regardless of whether they are students with SEN. However, for the adoption of narrative assessments to be sustainable, a supportive school policy would play an important role. All teachers from the school should be convinced of the power of narrative assessments before they could embrace its adoption.

Incorporating Strength-based Individual Learning Plans into Life Planning for Senior Secondary Students with Mild Intellectual Disability

YEUNG Sheung-laam
Shatin Public School

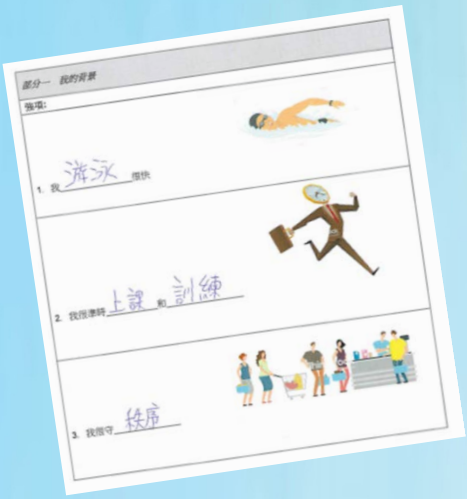


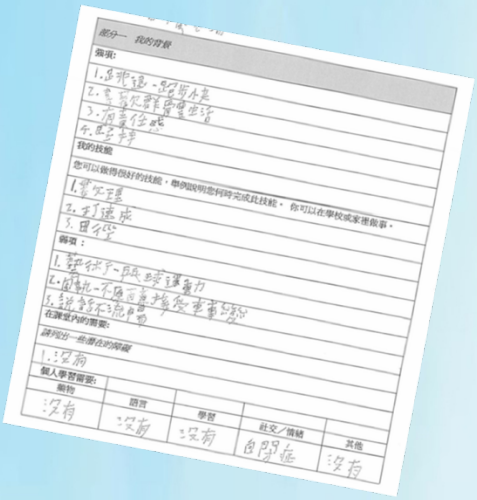
Mode of Delivery for Life Planning Education

Our school started designing and implementing a school-based life planning education curriculum in the 2014/15 school year. So far, we have initially worked out the learning elements for various stages of life planning education, and tried out a Life Planning Guidance Programme at senior secondary levels for two years, thus setting a clear direction for future development. While it takes time for the curriculum and learning elements of the Programme to mature, we are pushing the pilot ahead with a view to strengthening students' competence in charting a course for their future. To this end, the pilot project is expected to follow through the development of a

curriculum and learning elements for the Life Planning Guidance Programme.

The project aims to incorporate an Australian pedagogy known as "strength-based approach" into the Life Planning Guidance Programme, where individual learning plans with personalised teaching content are designed for students according to their strengths. It is hoped that individual learning plans will help students with mild intellectual disability improve their social skills (including communication and collaboration competence), and enhance their competitiveness after graduation.





Project Objectives

The project seeks to:

1. Help students identify on their own and give full play to their personal strengths;
2. Find ways to assist students in planning and achieving their (short-term and long-term) goals;
3. Enhance students' motivation and interest in active communication; and
4. Improve students' collaboration skills.

Major Stages and Tasks of the Project

The project comprised four stages. Stage One mainly involved preparing a template for devising individual learning plans for senior secondary students with mild intellectual disability in our school by drawing reference to the Australian approach, and formulating the timetable and method for implementation. Stage Two involved collecting and analysing data, observing and keeping records of students' performance in class and during recesses, understanding the background, interests, strengths and distinct qualities of the students concerned through questionnaires and interviews with parents and teachers, and devising appropriate individual learning plans based on assessment results. In Stage Three, teachers guided students in working out their individual learning plans and setting short-term and long-term goals. While assisting students in implementing their short-term plans, teachers evaluated the effectiveness of these plans and made modifications to students' long-term goals accordingly. In Stage Four – the final stage, teachers helped students execute their long-term plans and evaluated the effectiveness of such plans.

Implementation Difficulties and Challenges

We encountered many difficulties and challenges along the way. First, teachers were inundated with the preliminary work for the implementation of individual learning plans, including collecting and analysing data (e.g. students' background, strengths and distinct qualities, etc.), setting goals (i.e. short-term and long-term goals), devising individual learning plans, and discussing with relevant parties on the directions for setting and realising long-term and short-term goals. Hence, teachers had to spend an inordinate amount of time closely following up on each case. Second, implementing individual learning plans required keeping track of each student's progress on a case-by-case approach, and involved certain administrative inputs on the part of the school. Yet as far as internal coordination is concerned, improvement is still needed for the lesson and manpower arrangements of the Life Planning Guidance Programme.

Effectiveness and Impact of the Project

On the whole, the pilot project was a success. As revealed by parents' feedback and teachers' observation of student performance in class, the strength-based approach was conducive to enhancing students' learning and their communication and collaboration skills. Instead of focusing on students' deficits, this approach tapped into their strengths, enabling them to identify on their own what they were good at and boosting their competence and confidence, and hence their learning motivation.

Participating students benefited a lot from the project. They managed to identify their strengths and interests and develop them fully. With the help of teachers, they were also able to plan and realise their goals, and engage in active communication, which brought an enhancement to both communication and collaboration skills.

Impact on My Educational Philosophy and Practices

I firmly believe that putting the emphasis on students' strengths can enhance their confidence and learning progress. Students with special educational needs, regardless of their ability levels, may equally benefit from such teaching. While having their own limitations, they possess their own strengths, too. It is therefore necessary to tap into and tailor our teaching to their strengths. In addition, teachers can help them fully develop their unique personal characteristics and facilitate their smooth integration into society by flexibly deploying all community resources available.

Hence, my approach to teaching design begins with gaining a thorough understanding of students' needs by, for example, inviting them to talk about their strengths and interests. I then design appropriate teaching content that is of actual help to students and parents. Moreover, individual learning plans enable students to participate in activities they like, and derive satisfaction and self-esteem from the process. It also helps maintain better relations among students, teachers and parents, resulting in a major uplift in students' mood to learn.

Programme A(3) – STEM Education

Mid April – Early June 2018

Exeter, the United Kingdom

Administered by the Education Bureau, the Programme consisted of both local and overseas components. While the local part of the programme was supported by Department of Education Studies, The Hong Kong Baptist University, the overseas customised programme was conducted by the Graduate School of Education (GSE), University of Exeter.

The customised overseas programme aimed to enable participants to

(a) acquire knowledge of the local education system and its key features as well as the focus of STEM education in the UK;

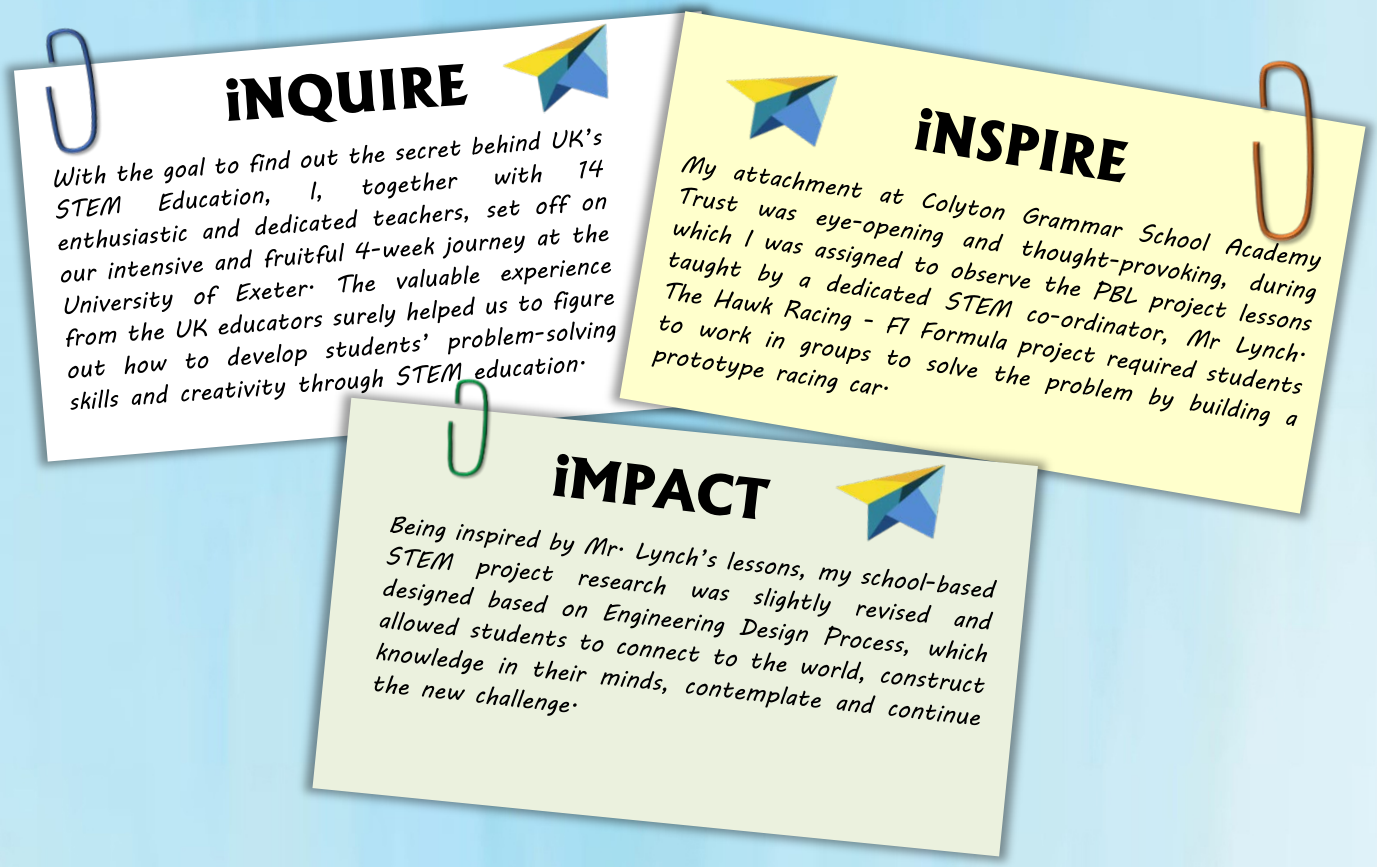
(b) enhance their professional capacity in implementing and promoting STEM education holistically and effectively at school level;

(c) integrate structured learning and attachment experience to become reflective practitioners; and

(d) develop teacher leadership through sharing learning outcome in Professional Learning Communities (PLCs) and disseminating good practice, with a view to strengthening cross-curricular and/or cross-sector collaboration among teachers and the partnership with community stakeholders.

STEM Space Challenge

Calvin CHOW Wing-hei
Christian and Missionary Alliance Sun Kei Secondary School



New Curriculum for Junior Secondary Students

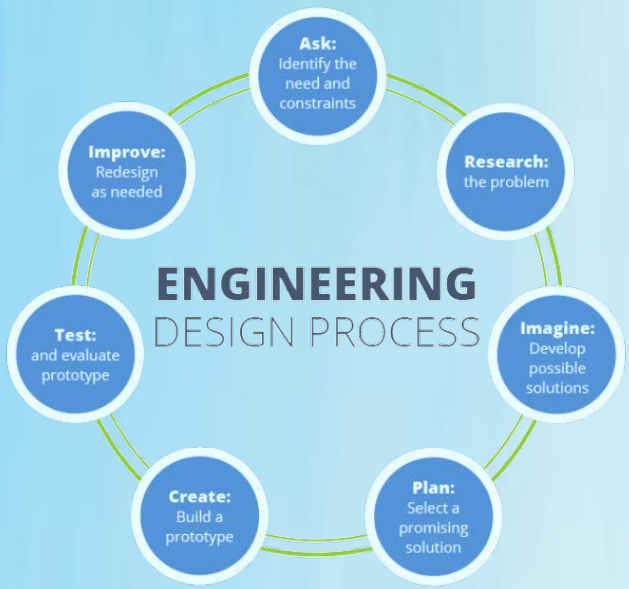
Our school has been dedicated in promoting STEM education for several years. To equip junior secondary students with STEM skills such as problem solving skills, a STEM Project Research, under the school-based STEM curriculum, has been developed and implemented in S.1 and S.2 since 2017/18. The Project aims to sharpen students' mechanical and technological skills by asking them to use science and mathematics knowledge to build and code LEGO EV3 brainstorm robot (which they had learned before) in different space challenges. In the project, students were expected to understand how to identify and solve problems by using the Engineering Design Process (EDP), as well as to better understand concepts of science and mathematics after completing the project.

The objectives of the STEM Project Research are to enable junior secondary students to:

1. enrich their knowledge of space science;
2. explore and develop their higher order thinking and problem solving skills using the Engineering Design Process (EDP); and
3. learn more about the development of aerospace science in China.

Using EDP for Problem Solving

Inspired by the application of EDP to solve real-world problems in schools in England, as observed through school visits in the 'i-Journey' Scheme, I decided to apply EDP to the STEM Project Research. In the project, students were asked to identify real-world challenges / problems and work out solutions in a systematic and orderly way using the EDP and LEGO EV3 robots which they had learned before. These challenges included making a line-following doodling robot / a coding robot and inventing a gadget for astronauts living in space, etc.



Learning and Teaching Strategies

- Lessons were designed with reference to the **5E Framework** developed by Roger Bybee.
  - *ENGAGE*: Flipped classroom video clips were prepared for every lesson so that students could acquire prior knowledge and learn about the challenges before lessons.

  - *EXPLORE*: During the constructing process, students would be familiar with LEGO EV3 robotic hardware and software, and would learn knowledge about engineering and technology when tackling the problems.
  - *EXPLAIN*: Teachers raised questions to let students find out the key concepts of STEM.
  - *EXTEND*: Students used the prior knowledge to build a LEGO EV3 robot for different challenges.
  - *EVALUATE*: Teachers checked students' learning process and stimulated their thinking by probing questions to make sure they were on the right track in the lessons.

- Video clips were uploaded to a **Google classroom** created by teachers. Students could watch video clip demonstration before lessons and upload the record of their robot performance so that teachers could keep track of students' progress.

- Students were required to complete an engineering logbook and a final report that included different aspects, i.e. Idea, Techniques, Evaluation and Reflection.

Results of Evaluation

A questionnaire and interviews were designed and arranged for collecting students' feedback on their learning after completing the one-year lessons. Results showed that more than 70% of students agreed that (1) the activities improved their high order thinking and problem solving skills; (2) the activities enriched their knowledge of space science; and (3) their awareness of development of Aerospace Science in China had been increased through discussion. Moreover, students were able to reflect on how to improve their work and what important skills they had learned. They commented: "We thought the key technique of problem solving was trial and error. We have to keep refining the solutions and redesigning the prototype for a better solution", and "We found that collecting enough data was very important for brainstorming the solution".

Showcases

Six students were asked to demonstrate their final products at the STEM Project Learning Academic Day, focusing on presenting how to apply EDP to solve STEM challenges.

S2 students showed how they modified the programme to get the best time record in the "Line Follower Challenge".

S1 students presented their idea of how to get the equipment fixed at a certain place and not to float in a zero-gravity environment.

S2 students made a timer with EV3.

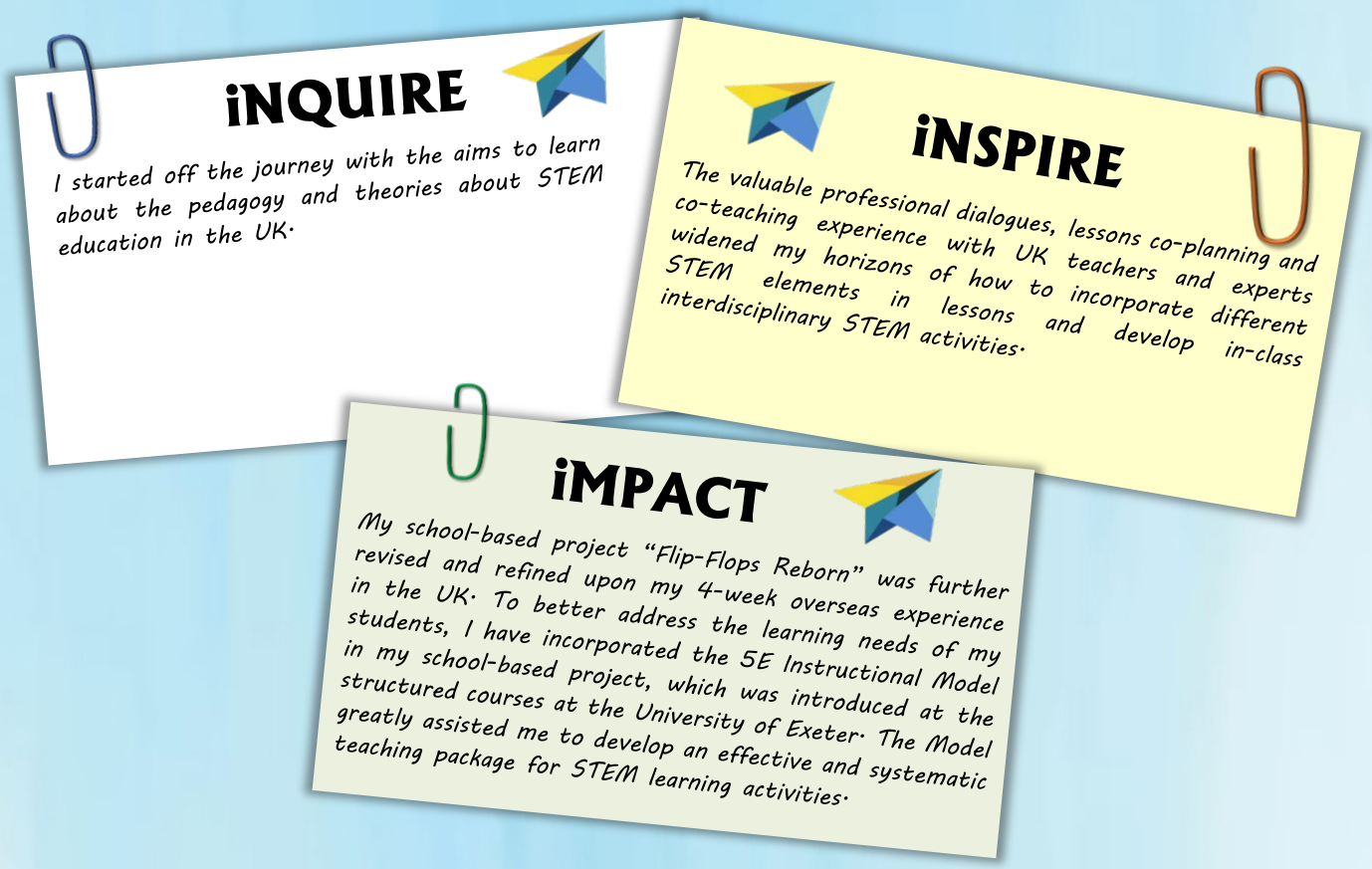
S2 students, the champion of the "Microsoft GirlSpark Camp 2018", demonstrated how to use a mirco:bit to invent a gadget to prevent back pain in the workplace.

Conclusion

Students' electronic and technological knowledge and problem-solving skills and strategies had been enhanced through their application of EDP for solving STEM challenges. Students liked to apply EDP to divide problems into manageable steps of work such as researching problems, creating prototypes and refining the solution(s). This helped sustain their motivation to tackle STEM challenges. Students were more engaged in the technology and science lessons. They had also become more confident in meeting challenges in technology and science.

Flip-Flops Reborn – Impact on Female Students' Career Aspirations

Kirk LEUNG Lok-hin
HKICC Lee Shau Kee School of Creativity



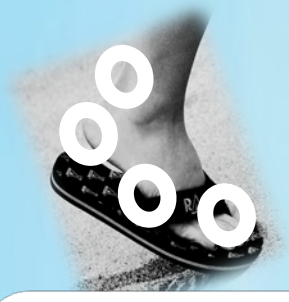
Female Career Aspirations in HKICC Shau Kee School of Creativity (HKSC)

Over 70% of HKSC students are females these few years. According to an informal survey, most students expressed that they enjoyed art and design related subjects, and some of them were not interested in acquiring mathematical and technological knowledge and skills because of poor performance and bad learning experience in junior high schools. Besides, a longitudinal research project studying young people's science and career aspirations funded by the Economic and Social Research Council of the UK found that some female students performed well in science-related subjects, but most of them would not choose STEAM-related jobs as their career. It was also found that existing social inequalities would influence current careers education and low science capital students would limit their STEAM aspiration (Archer & Moote, 2016). This means many students would not consider their future careers in the STEAM field.

Background

To attract more female students to participate in the STEAM project, 'flip-flops design' was chosen as the main theme. Flip-flops have become popular and fashionable footwear for both males and females around the world in recent years. However, there have been complaints about the easily broken straps and the difficulties to fix them properly. The ergonomics of flip-flops also need to be improved as they do not have good cushions for long walks. Therefore, the project named 'Flip-flops Reborn' was created.

Straps of flip-flops are easily broken but difficult to be fixed



Ergonomic problems caused by wearing flip-flops

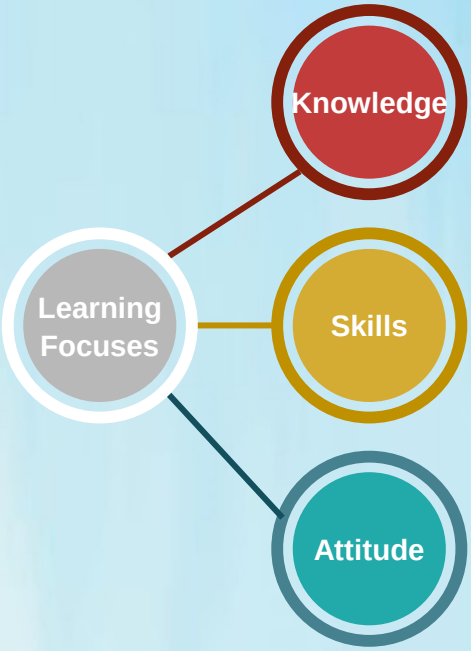
Objectives

The objectives of the project are as follows:

- To increase female students' STEAM aspiration
- To help students identify needs of the community and environmental sustainability development
- To develop students' empathy for community stakeholders
- To train students to be able to use STEAM knowledge to improve the community
- To stimulate the initial interest of students to further develop future community projects

Learning Focuses

The learning focuses of the project cover three areas, namely knowledge, skills and attitude:



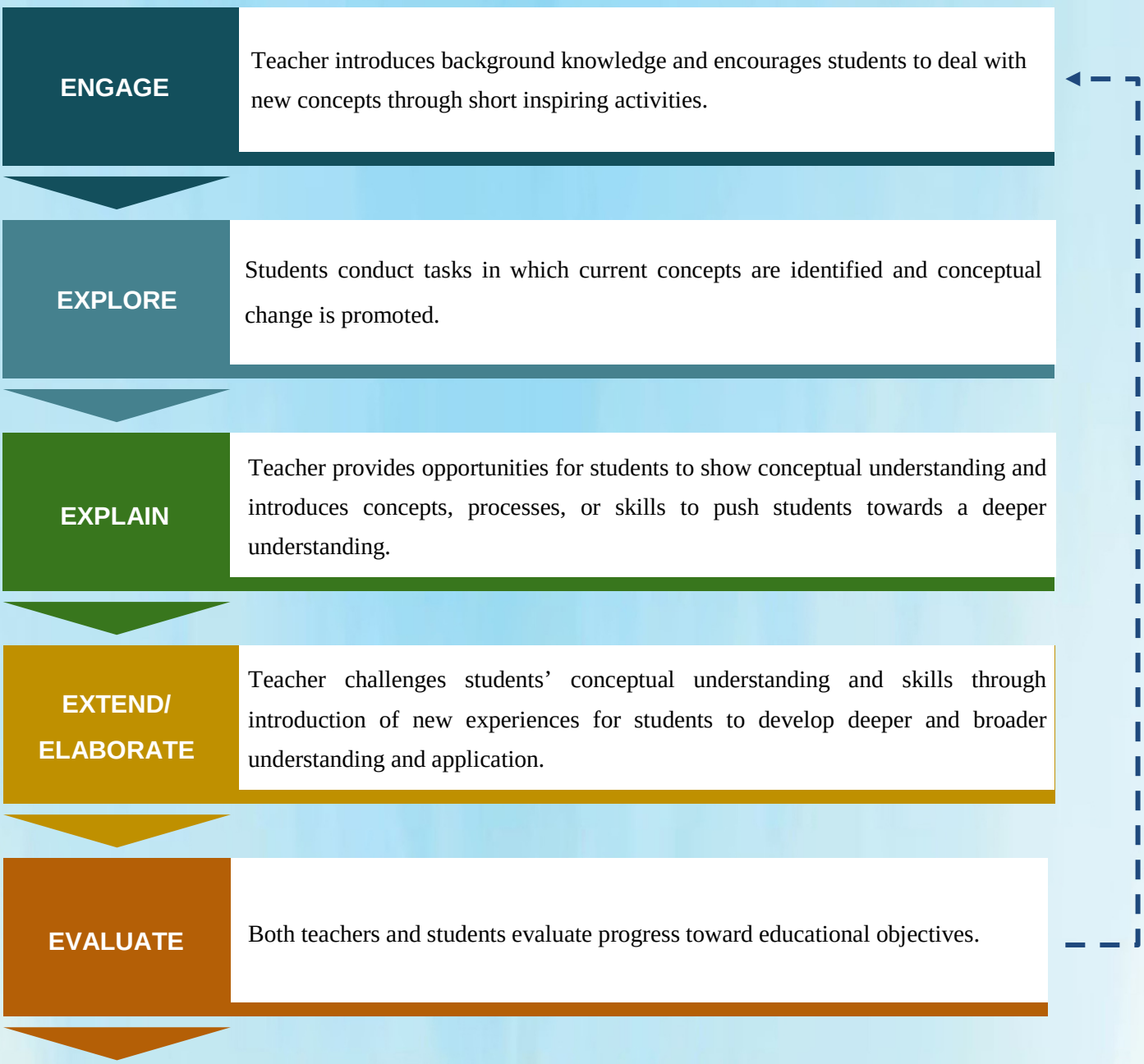
To recognise the concept of upcycling, design and structure of flip-flops, the ergonomics of footwear, materials of 3D printing, the relationship of volume and mass through CAD, and linear programming

To apply the 3D scanning technology and operate 3D printer, and calculate the volume and/ or mass of 3D printing materials, and the linear optimisation of the cost

To care about users' needs and environmental sustainability through full utilisation of resources, e.g. upcycling unused products into something useful

5E Instructional Model

The 5E instructional model, which is a five-stage teaching sequence developed by Roger Bybee (2015), was applied to the project. The 5E stands for:



Major Activities

- In-class interdisciplinary STEAM lessons were conducted. The 15-week lessons involved different subjects such as DAT, ICT, Science and Mathematics. An intensive STEAM 3-day workshop was also arranged. Through the lessons and workshop, students learned basic sketching and CAD drawing skills.
- A learning package was developed. Students learned how to use Autodesk Fusion 360 to build 3D models of their designs. They recorded the ideas generated in the workshop, the design process and interview notes using the log book designed by individual students. They then presented their projects using photos, online video clips, log book design and presentation boards.

Students' Feedback

Students' feedback was collected through questionnaires and interviews. The results revealed that most of the participants, of whom 65% were females, reflected that their STEAM aspiration had changed after completing their projects and they would consider a career in the creativity and technological industry. A female student stated that she had learned different kinds of knowledge and skills, such as interview skills, operating 3D scanner, rebuilding the upcycled flip-flops by computers, using 3D printing with new materials and using linear programming in product design. Most importantly, she expressed that she had developed an interest in STEAM-related jobs in future.

Conclusion and Suggestions

Regarding the knowledge gained in the project, students learned more about the ergonomics of human feet, the principles of 3D scanning, the properties and application of different materials such as TPU (soft materials) and nylon, and the application of mathematical theories such as linear programming in real world design and development. Concerning the skills, this project enhanced students' 21st century skills, such as critical thinking, creativity, collaboration, communication, information literacy, media literacy, productivity, social skills and technology literacy. Apart from knowledge and skills, students also understood more about different jobs in the STEAM industry including jobs related to product design as well as design and development and they are more willing to accept these career opportunities.

Way Forward

A new programme will be launched in the next academic year. It is a 7-week (one lesson per week) STEAM programme for ALL S5 students. Different STEAM workshops involving a combination of different subjects will be arranged. Collaboration across different subjects will be strengthened. Students will be given more flexibility and will be free to choose 1 out of 4 STEAM programmes, such as a programme related to Mathematics+ICT+VA or Mathematics+DAT.

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STEAM for All; Technology for Living

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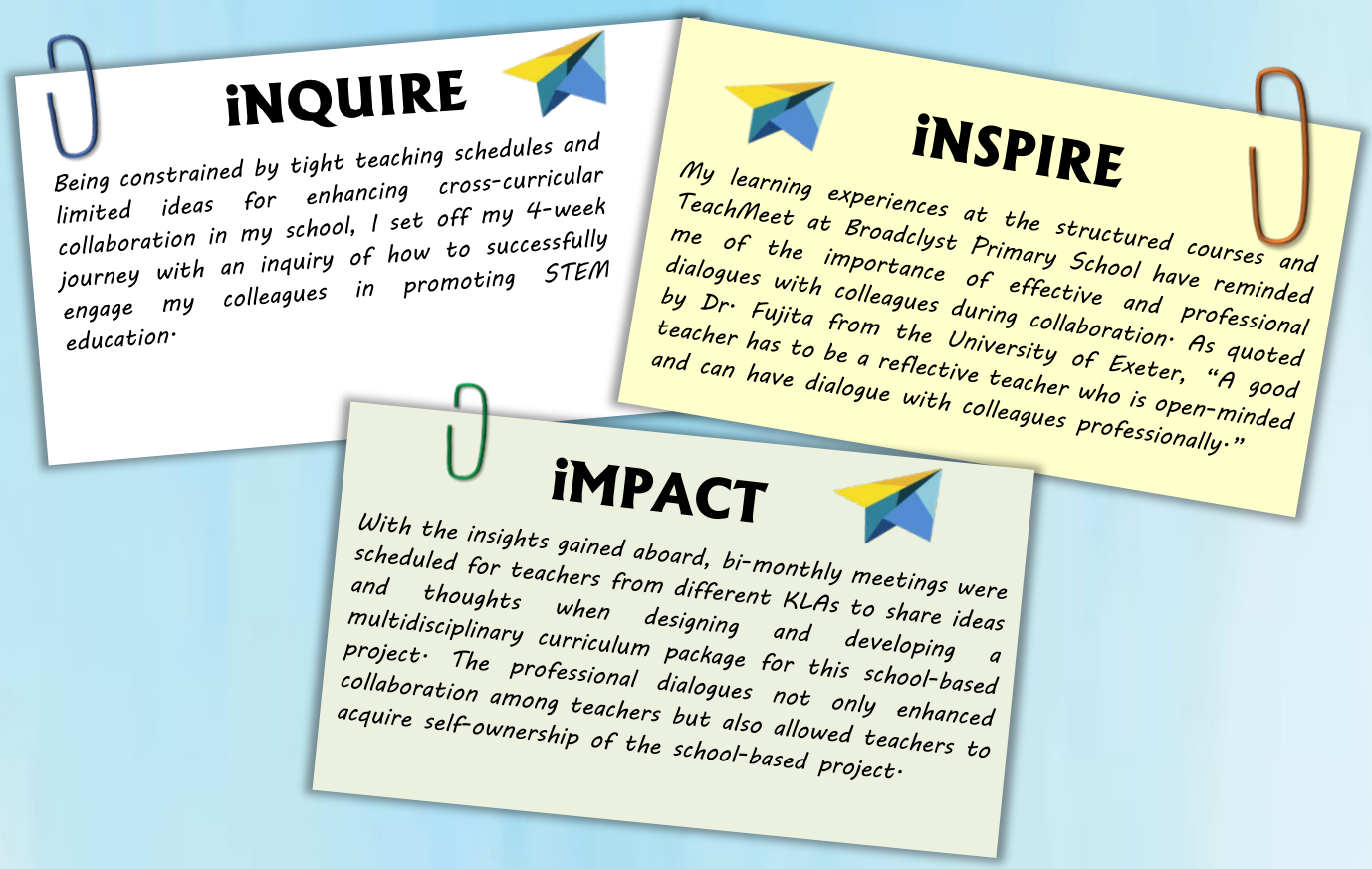

***Why?* – "STEAM for ALL"**

In recent years, STEM or STEAM education is being emphasised in the ongoing renewal of the school curriculum so as to better equip our students with scientific thinking and to cultivate their interest in Science, Mathematics and Technology in a rapidly changing world. In our school, teachers are overwhelmed with learning and teaching activities in their own key learning area (KLA) and have no time to work collaboratively with teachers in other KLAs so it had been difficult to promote STEAM education.

To solve this problem, the concept of "STEAM for ALL" was introduced. Teachers from different KLAs were invited to develop and design a multidisciplinary curriculum package so that teachers did not need to design extra learning activities to promote STEAM education outside normal teaching schedule, and all the students could acquire knowledge and skills across different subjects/disciplines in normal lessons. In addition, teachers' professional development could be enhanced through developing and designing the multidisciplinary curriculum package collaboratively.

S1 students – Visit to Ocean Park and Students' Work

S2 Students – Discussion on how to design a healthy meal and promote a healthy eating habit

***What?* – "STEAM for ALL"**

"STEAM for ALL" is not only for students, but also for teachers. The aim is to cultivate students' scientific thinking and promote their interest in Science, Mathematics and Technology and the objectives are to

1. strengthen students' abilities in investigating, exploring, integrating and applying their knowledge and skills across different disciplines' hands-on activities;
2. enhance collaboration among teachers of different KLAs in planning and organising STEAM-based learning and teaching activities in the curriculum; and
3. motivate teachers to work on new learning and teaching activities involving STEAM education in their curriculum.

***How?* – "Technology for Living"**

A main theme "Technology for Living" was created to develop a multidisciplinary curriculum package for all S1 and S2 students. The subjects involved in the package for S1 students were Mathematics, Computer Literacy and Science whereas Mathematics, Science, Integrated Culture and Practical Design and Technology (ICP D&T) module, and English were included in the package for S2 students.

In the junior science curriculum, S1 students were expected to learn science process skills, such as observation and classification. This was aligned with Ocean Park's "Connecting students with Nature through STEAM" programme in which our school was selected to take part. All S1 students attended a learning activity named "Act as a biologist" and were asked to create an identification key and marine life model to learn about the problem of ocean debris and its effects.

A multidisciplinary curriculum package was designed for 2 classes of S2 students. The first part was a collaboration between the Mathematics and Science curricula. The theme "breakfast" served as a linkage between the two subjects. Students were required to apply "Rate and Ratio" from Mathematics and "How do we obtain energy?" from Science to design a healthy meal and promote a healthy eating habit.

The second part of the curriculum used "windmills" to link up the subjects ICP D&T module, English and Science. Students learned the form and function of windmills and four major kinds of pollution through designing and making a wooden windmill model.

What changes have students and teachers made?

S1 students appreciated that they had learned more about the work of a biologist through the animal observation activities in Ocean Park. They enjoyed creating the identification key and the marine life models to show their concern about the effects of marine debris on marine lives. Students demonstrated the ability to integrate their knowledge acquired from the previous activities (projects and visits). They were also willing to change their own habits to ease ocean pollution. This message was promoted to the whole school in the campus TV programme by selected groups.

In the creation of identification key and marine life model session, students showed their problem solving ability as limited materials were provided. They completed the creation through distributing jobs and discussing what to do with teammates. This showed there were good communication skills among students. The end products were far beyond our expectations. Students showed their creativity by observing details in the plastic products and transformed waste into marine life-alike models. Creativity, communication skills and collaboration skills are key learning and innovation skills for the 21st century.

From the planning and implementing process of the curriculum package in S1 and S2, teachers reflected that they could know more about the content in different subjects and they were glad to see that students could apply what they had learned in a more daily life scenario, particularly in the breakfast designing activities, and expressed that this kind of cross-circular collaboration for a period of time would not only widen their horizons by observing other subjects' classes in the curriculum package, but would also be a taster to further the collaboration.

What is "Next"?

Teachers will definitely keep the activities in their curriculum in the next school year. I think this is one of the best examples of how we can promote ownership in creating STEAM-related activities in one's curriculum. In the coming school year, more collaborations will be established if topics can be aligned, and the developed packages will be refined and more subjects may join the collaboration.

Impact

My adventures with the 'i-Journey' Scheme motivated another colleague in the STEAM education group to join the programme on STEM Education under the 'i-Journey' Scheme in the 2018/19 school year. This implies that the participation of a teacher in a professional development programme outside school does not only bring changes to his/her school curriculum, but will also encourage colleagues to do more and learn more through professional development.

Developing a School-based STEM Education Project – "From We to Society"

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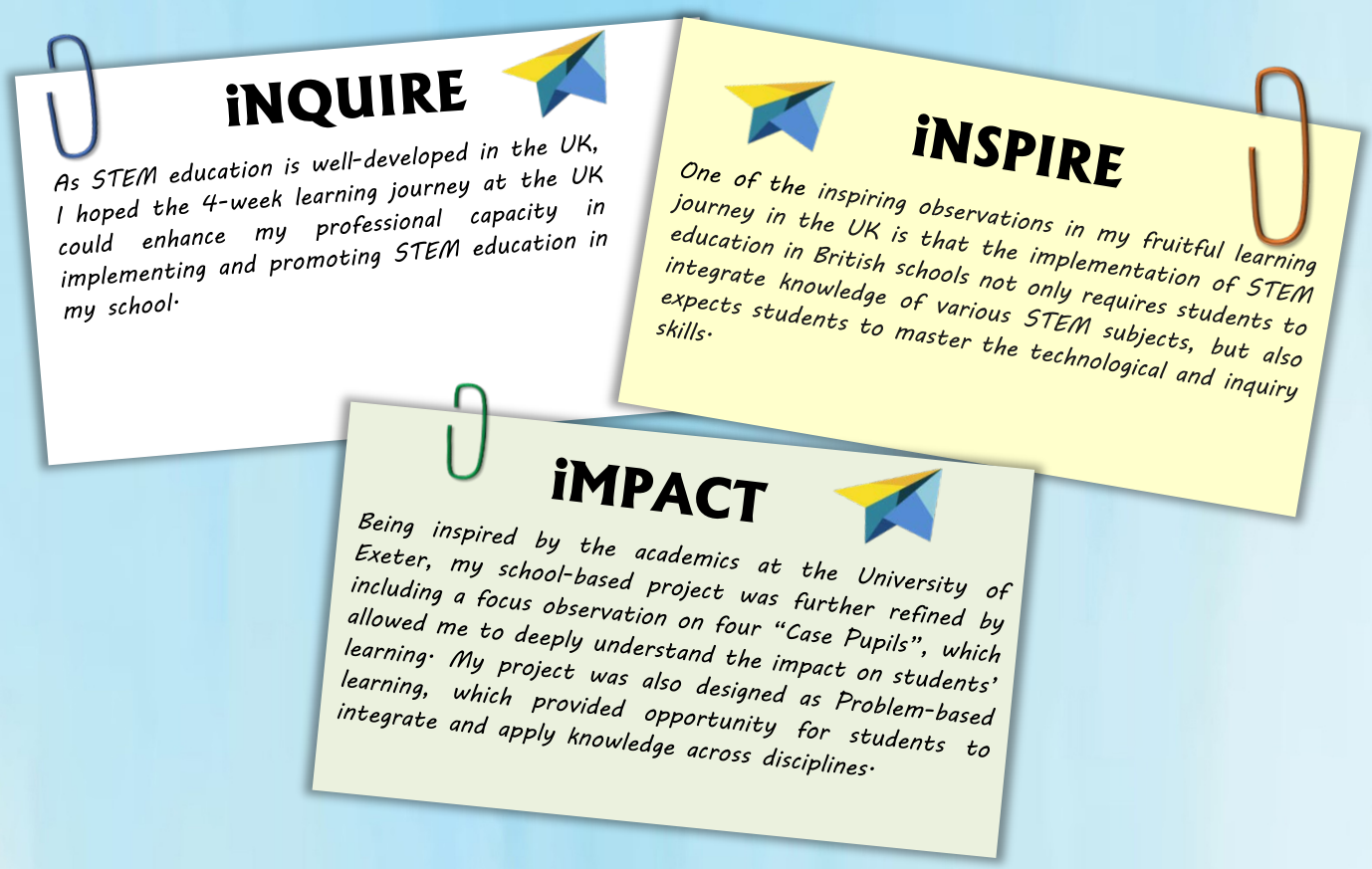

STEM-Education Project

Our school, Pak Kau College, started applying e-learning such as VR and AR as an aid tool to teach students several years ago. Though students could improve their basic subject knowledge and technological skills through e-learning, they could not apply these knowledge and skills in the real world easily. To address this issue, this project was developed to examine the assumption that STEM education could promote students' problem-solving skills and their abilities in integrating different subject knowledge (Science, Technology, Engineering and Mathematics) through a cohesive learning paradigm based on real-world applications (Hom, 2014). This project was developed to provide a platform for our students to learn how to integrate and apply different technological knowledge and skills to solve community-concerned problems through the approach of project-based learning.

The objectives of the project are:

1. To develop a STEM education framework consisting of fundamental training and project-based learning
2. To guide students to conduct a community-concerned project work by integrating their knowledge learned from STEM education

STEM Education Framework

In order to provide fundamental training in STEM education, the "Innovation and Technology Sessions" were arranged as extra-curricular activities after school once a week in the first semester. All S1 students in the 2018/19 academic year participated in the Sessions to learn about different knowledge and skills. The following five themes were developed for the Sessions:

- Science Exploration
- Digital Game Design
- Micro:bit Programming & Product Design
- Arduino Programming & IoT Application
- Innovative Robotic

The community-concerned project was scheduled for the last 4 weeks of the Innovation & Technology Sessions. Students were asked to find out the problems or the needs of the community and the corresponding solutions with the knowledge and skills learned from STEM education training, as well as "Design Thinking" skills. The table below shows the projects of S1 students:

Project Title	Community Group Concerned
Smart Safety Footwear（智能安全鞋）	Elderly people
Smart Food Labelling（智能食物標籤)	Customer
Anti-Drowsiness Driving System	Driver

Micro:bit Programme and Product Design Session

Science Exploration Session

Arduino Programming and IoT Application Session

Design Thinking Training Sessions

Students' Changes

Four S1 participants who participated in the "Science Exploration" group, "Innovative Robotic" group and/ or "Micro:bit Programming and Product Design" group of the Innovation and Technology Sessions were chosen as "Case Pupils" to investigate any changes in their learning just after attending the training sessions in the first semester and at the end of the academic year. The four Case Pupils were interviewed after the completion of training sessions and at the end of the academic year. The results indicated that there was positive impact on students' learning and interest in science and technology subjects. The feedback collected from two of the Case Pupils is summarised below:

After the training sessions	By the end of the academic year
"… This experiment cannot be learned in normal classes and I start assisting teacher in doing scientific research." (Student B)	"After further study, my interest in science exploration has been increased. I will study hard and hope that I will be a scientist in future." (Student B)
"I have learned Mirco:bit and how to write programme to control the on/off switch of an object (e.g. electric light and fan), and to use sensor to control objects. It is very practical." (Student D)	"I am very happy that I have not only learnt how to use Mirco:bit, but also Raspberry Pi and Python. I hope that I can write programming language for artificial intelligence in future." (Student D)

Increase in Students' Intention of STEM Learning

According to the results of the questionnaire survey for all the student participants of the training sessions at the end of academic year, at least 78% of respondents agreed that the Innovation and Technology Sessions enhanced their knowledge and skills in the training sessions. 64% of them considered that they understood more about the integration of Science, Mathematics and Computer Study. 82% of them were eager to continue to learn STEM-related knowledge and skills. 56% of respondents commented that they had confidence in helping others by applying the knowledge and skills learned from the training sessions.

As reflected by these results, the STEM Education Project not only enhanced S1 students' knowledge and skills in integrating science and technology-related subjects, but also increased their interest in studying STEM-related subjects and intention to explore STEM-related jobs in future.

Expectations and Way Forward

Students are expected not only to improve their knowledge and skills, but also be able to make use of the knowledge and skills learned from the STEM Education Project to help the people in need. The Innovation & Technology Sessions will be continued in the new academic year and students' interest in STEM-related activities such as A.I., Brainwave, AR, N.F.C. will be explored for the design and arrangement of the Sessions in the future.

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A Love STREAM Project for Girls

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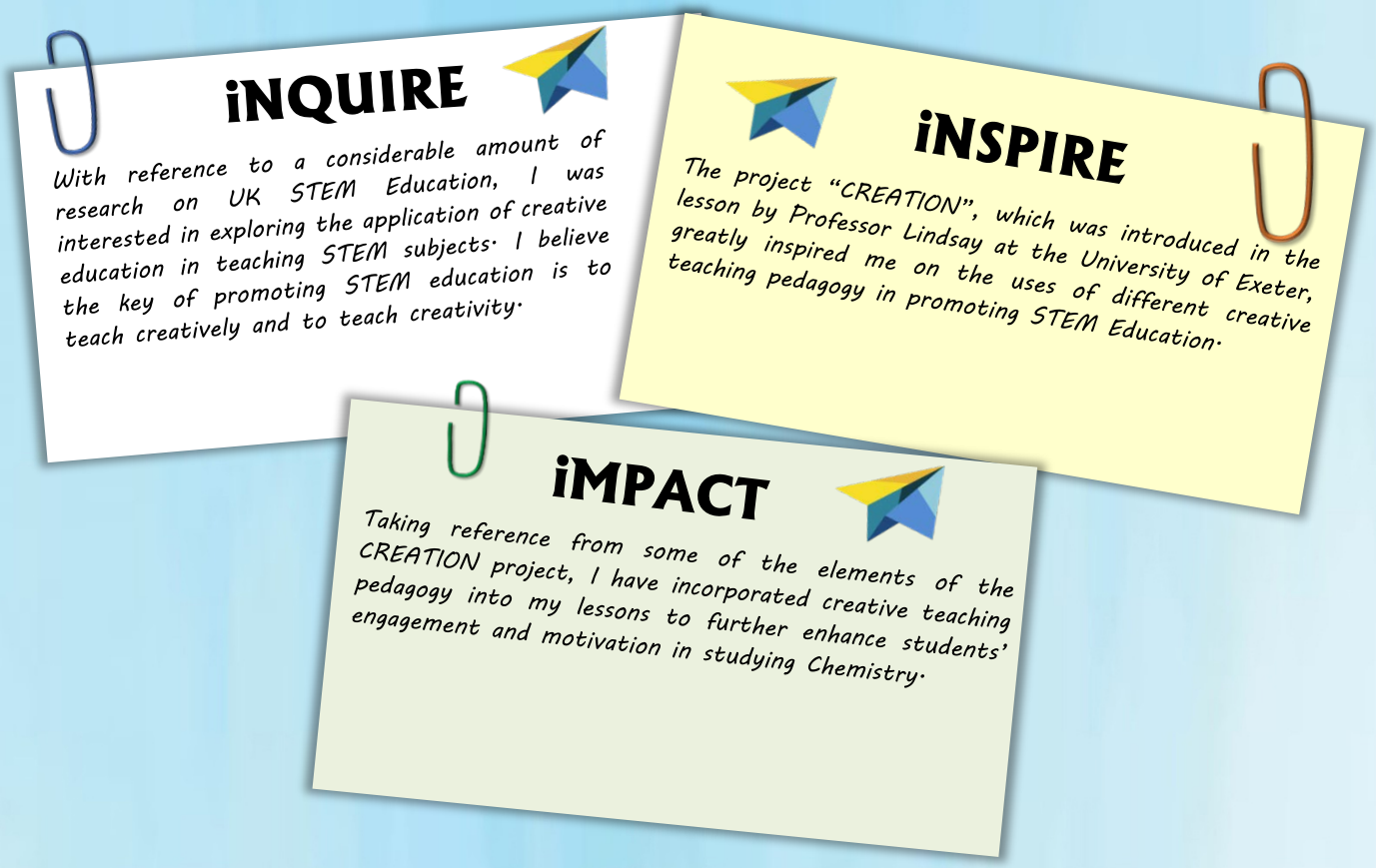


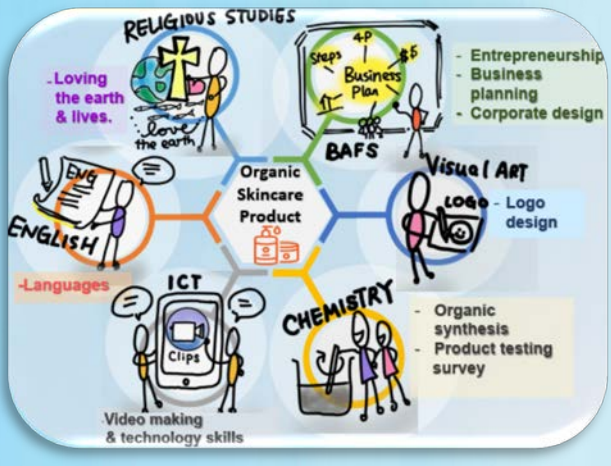
A Project for Nurturing Students' Skills in Integrating Different Subjects

STEM/STREAM Education has been promoted in secondary schools in Hong Kong for more than 10 years. To provide more opportunities for students to acquire knowledge and skills in integrating different subjects in my school, which is a Catholic secondary school for girls, a project named "Love STREAM: Making Organic Skincare Products" was designed. The project provided a platform for S3 female students to express love to others, cultivate an interest in learning STEM subjects, and most importantly to integrate and apply knowledge and skills across different subjects.

This Love STREAM project aims to nurture students' integrated skills of Science, Information and Communication Technology (ICT), English, Visual Arts, Business, Accounting and Financial Studies (BAFS) and Religious Education (RE). The objectives of this project are to enhance (1) students' engagement and motivation in studying STREAM subjects; and (2) students' knowledge and skills in integrating different subjects.

Framework of Cross-curricular Learning and Teaching

A cross-curricular learning and teaching framework was developed to achieve the above-mentioned aim and objectives of this project. Besides, product making lessons were designed with reference to the 6E Learning byDeSIGN™ Model, a student-centred model that blends design (context and concepts) and inquiry (Burke, 2014).



Framework of cross-curricular learning and teaching

Implementation

A variety of activities and tasks were arranged for the project, which included

(a) An introductory session – One lesson was scheduled to introduce the project and its connection with each subject, as well as the engineering design process (EDP), to the participating students.

(b) Setting up a business – Students were introduced the knowledge of entrepreneurship and corporate design in BAFS lessons.

(c) Making products – Teachers applied the 6E Learning byDeSIGN™ Model, such as *Engage*, *Explore*, *Explain*, *Engineer* through integration of EDP and *Enrich* and *Evaluate* through the design of teaching content and provision of an opportunity for students to make skincare products in BAFS and Science (Chemistry) lessons.

(d) Discussion on environmental problems – Students were led to discuss and reflect on the use of microplastic in artificial skincare products. They explored the corresponding pollution problems and proposed actions to solve these problems in RE lessons.

(e) Designing a company logo – Students were guided to design a company logo by applying the design theory learnt in Visual Art lessons.

(f) Producing a promotion video – To showcase what the students had learnt and had done in this project, students were required to design and produce a video to promote their skincare products, and conduct a presentation in English lessons.

Making products in lessons

Students' final products and their presentation

Evaluation Results and Feedback

A survey and interviews were conducted to collect students' and teachers' feedback on the project. Overall, the project received very positive feedback from students. According to the results,

- at least 85% of students acquired knowledge and skills of organic synthesis and skincare product making through Chemistry lessons and application of the EDP model;
- around 83% agreed that they had developed an entrepreneurial spirit; and
- over 90% considered that they were able to use creativity and critical thinking and had learned how to collaborate with their classmates when doing the project. They also enjoyed the process of making organic skincare products.

Moreover, students reflected that their interest in Chemistry, Visual Arts and BAFS had increased. They had enhanced their understanding of the existing brands of skincare products in the consumer market. They also commented that they liked learning by doing, the trial-and-error process and the flexibility to choose what products they would like to produce. Through this project, they had also enhanced their English abilities and collaboration skills.

On the other hand, teachers agreed that students' final project presentations showed that they were able to integrate and apply knowledge of different subjects. Teachers also commented that, compared with students' attitude and performance in other activities of individual subjects, students' effort and motivation in completing this Love STREAM project were much higher.

Conclusion

The project was carried out as planned and implemented successfully. The quality of students' performance, including their learning process, final products and presentations, was satisfactory. Students found the experience enjoyable and invaluable as they could apply knowledge and skills of different subjects throughout the project. Furthermore, the learning activities in various subjects enhanced students' learning interest, motivation and engagement.

Reference

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A Study on Productive Failure as a STEM Pedagogy

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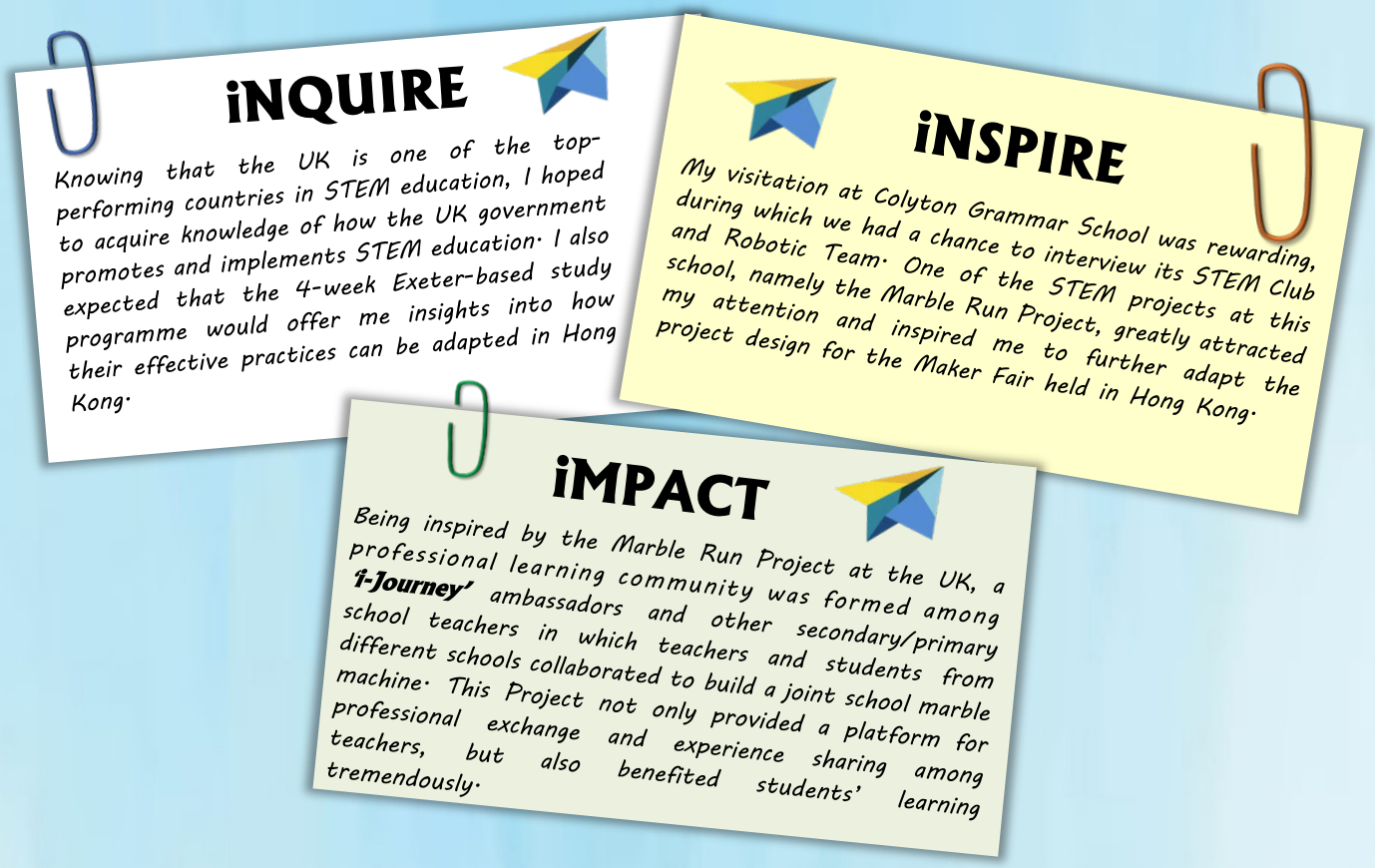


Background of the Research Study

Productive Failure (PF) is an instructional design introduced by Kapur (2016) and it stated that PF "afforded the students the opportunities to generate suboptimal or incorrect solutions to a novel problem for preparing them to learn better from the subsequent instruction that followed". Based on Kapur's concept, PF design was proposed to be implemented in the science lessons as part of a STEM-for-ALL curriculum in my school.

Research Question

Can PF improve the ability of low academic achievers to acquire scientific concepts and knowledge to solve novel problems in a STEM-for-ALL curriculum?

To answer the above question, a preliminary study was designed to test whether PF instructional design could affect low academic achievers' performance in the context of a STEM school.

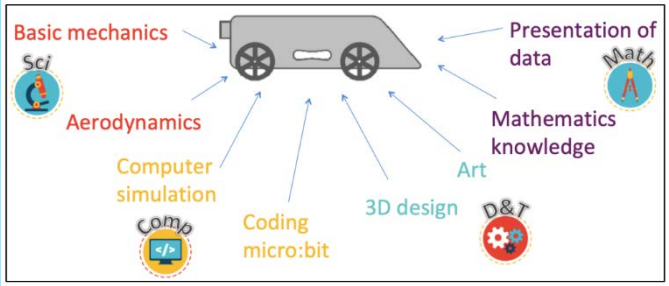
Methodology

The theme "Race for the Line" was chosen for S2 students. They were expected to acquire basic knowledge of different subjects and apply the integrated knowledge of four subjects – Integrated Science, Computer Studies, Mathematics and Design and Technology to construct a racing car.

A quasi-experiment research design was applied. All four classes of S2 students were invited to take part in a pre-test in the first lesson for the identification of 'treatment' and 'control' class(es). Consequently, three classes participated in this 6-lesson research study with one class as the 'treatment' class and two as 'control' classes. Students in the control classes were taught by direct instruction of concepts and provided with the help of laboratory technicians to make their cars.

Students in the treatment group were introduced the PF design modified by Song (2018). Tasks included in the design were: (1) exploration and understanding; (2) representation and formulation; (3) planning and execution; and (4) monitoring and reflection.

Students followed the six steps, i.e. (1) understanding the rules; (2) study and research; (3) design; (4) building; (5) test and modification; and (6) race to make a rocket car with the provision of minimal advice by teachers. In the sixth lesson, a post-test was conducted to examine any changes of the students' scores. Interviews of students were also arranged to further investigate how and what the treatment group of students had learned in the lessons.



An interdisciplinary design of the STEM-for-ALL curriculum

Table 1. Lesson Arrangement for the Study

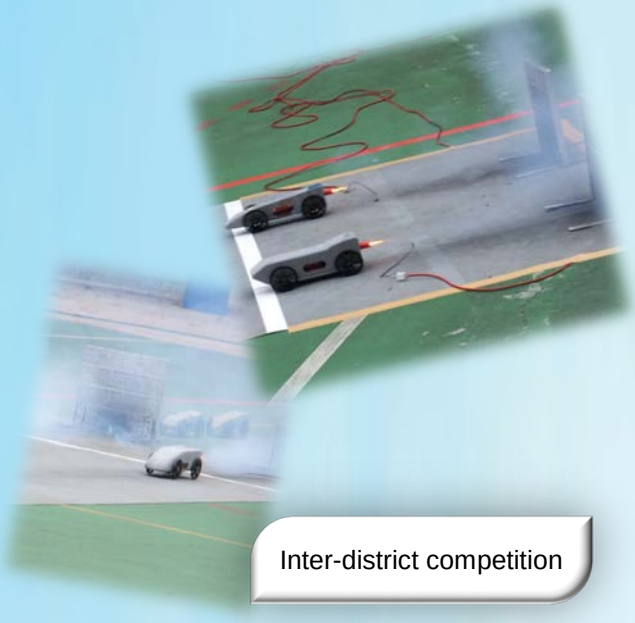
Class / Lesson	1	2	3	4	5	6
Treatment	Pre-test	Making of rocket cars			Lecture and refinement	Post-test
Control		Lecture: The concepts of kinetics		Making of rocket cars		

In addition, to motivate students to engage in the research study actively, an inter-class competition was held. Students were asked to use their racing cars for the competition. The best nine groups would then attend the inter-district competition. Finally, almost all of our students won the prizes. This reflected that in the process of designing and producing a racing car, students had acquired basic and integrated knowledge of different subjects.

Results

A pair *t*-test was used to examine any effect on the treatment group after they had attended the intervention lessons. The results showed that all students had improved significantly ($t = 6.303$, $p < .001$) in the post-test. It implied that the low academic achievers could improve their acquisition of abstract concepts through the pedagogy of PF. Results from interviews showed that students' knowledge and skills, in particular problem solving skills were enhanced. For example, students said that they were able to seek help and advice from peers so that some mistakes could be avoided. They also said that they could figure out what was wrong with the current model by comparing it with the previous design.

Inter-class competition



Inter-district competition

Conclusion and Way Forward

This study was designed to examine the impact of PF instructional design on students of low academic achievement to acquire scientific concepts and knowledge to solve novel problems in a STEM-for-ALL curriculum. To conclude, it has been proved that students, especially the low academic achievers, can learn better through PF instruction. In view of this, the PF instructional design will continue to be applied in my school. With reference to the experience of the present study, the implementation of PF design can be further improved by addressing, for example, (a) how failure experience is provided in the lessons and (b) how PF instructional design blends with DI for diversity management.

References:

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- Song, Y. (2018). Improving primary students' collaborative problem solving competency in project-based science learning with productive failure instructional design in a seamless learning environment. *Education Technology Research and Development, 66*(4), 979-100.