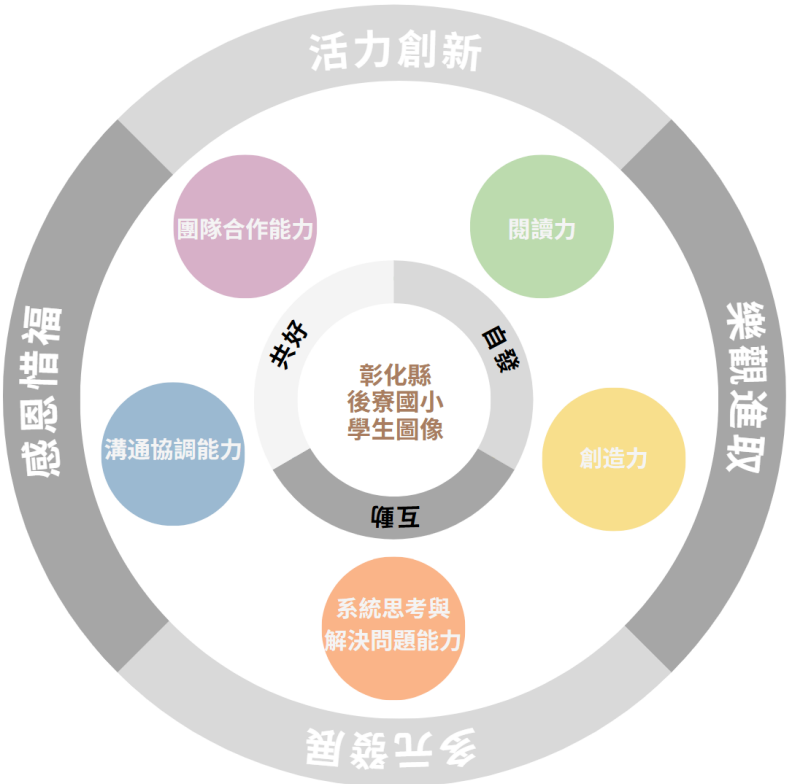
彰化縣芳苑鄉後寮國民小學　114 學年度學校課程總體架構

2、課程願景與目標

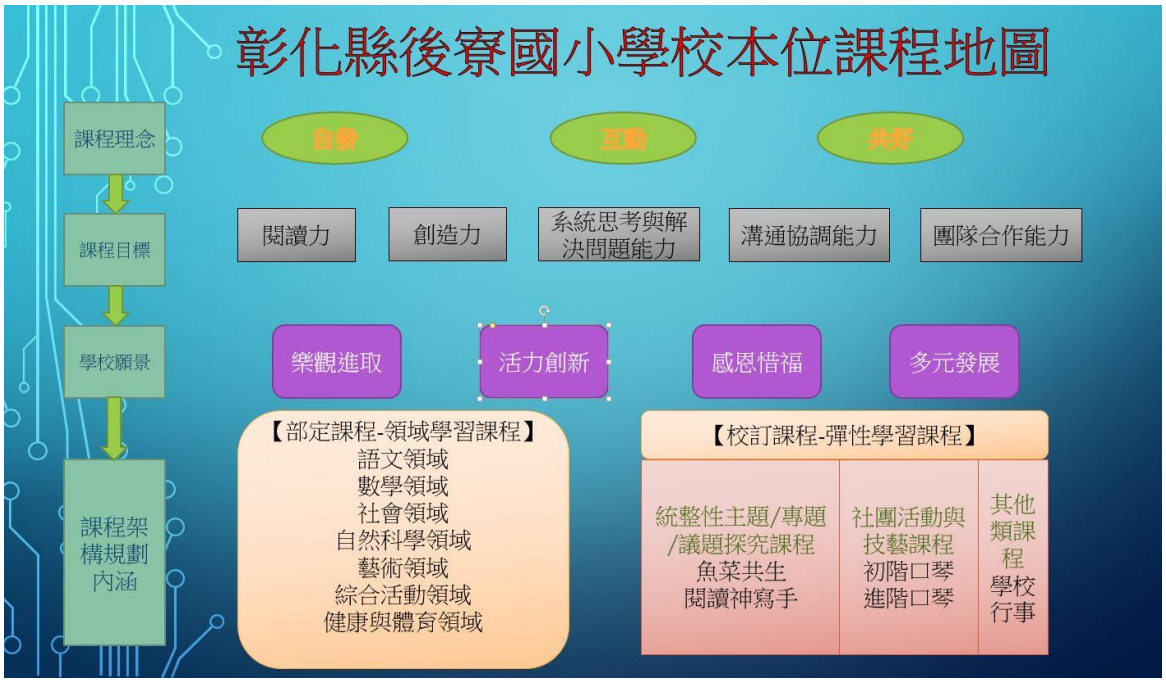
- 學校課程願景(以圖表或文字表述)

  以培養學生具有閱讀力、創造力、團隊合作能力、系統思考與解決問題能力、溝通協調能力為目的。

- 學生圖像：



➢ **課程地圖：**



➢ **依學校課程願景擬定課程目標與發展重點：**

一、計畫名稱

〝**後**來居上 Fan 輕鬆 **寮**苑生態 Wind 定贏〞

二、理念目的（與十二年國教核心素養或校訂課程之關連性）

盧梭曾經說過：「教育是人、經驗與自然的組合。」教育是一切自然與經驗的累積，自然是孩子最偉大的老師。本校位於彰化縣芳苑鄉臨海的偏遠地區，有豐富的自然資源及美麗的田園風光，屬教育優先區指標學校，亦為典型農村學區，家長多以農工為業，在偏鄉有別於都會地區的繁華與喧囂，學校的周圍盡是一望無際的田野，孩子身處在生態豐富的田野中，田野教室在草地上、在稻田間、在榕樹下、在花朵上及水溝裡，只要細細觀察處處可見生活中的活教材，為了維持生態的平衡及永續的發展，許學生們能永遠擁有一個自然和諧、創造思考、多元想像、實驗觀察及傾聽支持的環境，我們將善用在地資源發展學校本位特色課程，形塑學生兼具校本課程、環境生態、綠色能源、資訊技能與藝文欣賞的價值觀。

三、計畫目標

（一）成立校本課程推動小組，建立以生態綠能為主軸的校本課程。
（二）設置多元化溝通平台，即時傳達教學理念並分享教學成果。
（三）辦理食農教育感恩餐會，提升學生環境保護及食安意識。
（四）運用網路科技記錄學習歷程，達成有效的知識管理與擴散。
（五）參訪環境教育典範機構，觀摩成功經驗達成標竿學習目標。
（六）辦理生態保育備課工作坊，提升教師專業知能增進教學成效。
（七）鼓勵教師公開觀課及分享，形塑學習型組織及達成專業對話。
（七）引進專業機構多元化資源，建立策略聯盟與長期夥伴關係。

(八)建置雙語化生態學習環境，融入國際教育邁向全球化時代。
(九)建置E化導覽解說服務，爭取社區民眾理解與認同生態保育。
(十)導入企業資源挹注，確保生態保育課程的永續經營與發展。

四、校訂課程之內涵

本校位於彰化縣芳苑鄉臨海的偏遠地區，有豐富的自然資源及美麗的田園風光，屬教育優先區指標學校，亦為典型農村學區，家長多以農工為業，在偏鄉有別於都會地區的繁華與喧囂，學校的周圍盡是一望無際的田野，孩子身處在生態豐富的田野中，田野教室在草地上、在稻田間、在榕樹下、在花朵上及水溝裡，只要細細觀察處處可見生活中的活教材，我們將善用在地資源發展學校本位特色課程。學校本位課程以**魚菜共生系統**及**綠色能源**為主軸，運用在地田野生態資源為出發點，依照不同需求的學習對象，設計出系統化的魚菜共生及綠色能源教學課程，形塑學生兼具校本課程、環境生態、綠色能源、資訊技能與藝文欣賞的價值觀，進而建立愛鄉、護土的情操，並結合食農教育自產自用，培養學生感恩惜福珍惜資源的態度，具體實踐「感恩惜福與活力創新」的學校願景。

學校魚菜共生系統及學生種植蔬菜的活動照片

彰化縣縣長王惠美蒞校參觀本校魚菜共生系統的活動照片

彰化縣縣長王惠美蒞臨本校為孩子說蔬菜超人故事及享用本校綠能生菜美食的活動照片

Google grands

1. My Information

Name
Ya-ying Tseng

Title
Principal

Location
Changhua County, Taiwan

2.Organization Information

Organization name
Houliao Elementary School

Organization address 1
No.30, Fangliao Rd., Houliao Vil

City or Municipality
Fangyuan Township

State/Province/County
Changhua County

Zip code
528

Country
Taiwan

Phone number
+88648983184

Website
http://www.hles.chc.edu.tw

Board of organization
Our School is a public elementary school, therefore we do not have a board.

Annual budget of organization
2019 budget of our school is 18,713,000 NTD(=602,558 USD)

Operation budget of organization
Operation budget of organization-2017-12-31.pdf
Closing account of our school of 2017 is 17,385,466NTD(=559,812 USD)

3.Organization registration
Community Grants are intended for nonprofit and certain public organizations. We will not fund for-profit companies through this program. Nonprofit organizations must be registered with the Judicial Yuan.

Charitable status
Public Organization

Case number (登記案號)
Please provide the case number used when registering with the Judicial Yuan.

Registration number (登記號數)
Please provide the case number used when registering with the Judicial Yuan.

Name of legal person (法人名稱)
Please provide the case number used when registering with the Judicial Yuan.

4. Compliance information
Have any Google staff, officers or directors (or to your knowledge, immediate family members thereof) been members of your organization's board or officer group within the last 12 months?
No

If you answered "Yes" to the question above, please explain here:

Are any of the funds intended for advocacy or public policy?
No

To your knowledge, are any current government officials, employees or civil servants employed by this organization or are they members of this organization's board or officer group?
No

If you answered "Yes" to the question above, did the government officials, employees or civil servants solicit or otherwise take part in the grant request?
No

If you answered "Yes" to the question above, please explain here:

Are any grant funds being used to improperly benefit government officials, employees, or civil servants?
No

On behalf of my organization, I affirm that we do not have any dealings or programs involving or located in US sanctioned countries (as of June 2016, these countries/regions include Cuba, Iran, North Korea, Sudan, Syria, and Crimea).
I affrim

If you cannot affirm the above statement, please explain here:

5. Grant application
The Data Center Community Grants Program supports eligible organizations and initiatives focused on specific areas that Google values. Review the community outreach page for your location for more information. Email communitygrants@google.com with questions.

Project name
Digital Green and Mobile Learning for remote elementary students

Project budget amount
The Community Grants Program has a 10% cap on overhead expenses.
Approximate number of persons served
300 persons in remote area

Impact Location
Please indicate the geographic area or communities impacted by grant. When evaluating applications we consider impact in the immediate community surrounding the Google data center.
Fangyuan Township, Dacheng Township and Erlin Township of Changhua County

Focus area(s)
●Bridging the digital divide
○Capacity building - nonprofits
●Carbon reduction
●Green initiatives
●STEM - computer science
●STEM - other
●Strengthening the tech startup or entrepreneurial ecosystem

Population(s) served
●Economically disadvantaged communities
●Economically disadvantaged individuals
○Nonprofit community
●Students or teachers
●Underrepresented minorities
●Women or girls
○Other

Brief project summary

Our project, Digital Green and Mobile Learning for elementary students in remote areas, aims to introduce innovation technology and sustainability concept and practice to students and residents in the most remote area of Changhua County. It is our hope that through mobile devices, energy equipment and aquaponics participants will understand what kind of differences technology and green life style will bring to their daily life and future career paths. Students will benefit from using iPad to learn computer programming called "Scratch" and "One Hour Coding." Mobile learning is the trend of future. We believe firmly that providing students with mobile learning devices and proper teaching plan will assist the learning of children from economically disadvantaged family, whose presences are so common in remote areas. On the other hand, despite being one of the most remote areas in Changhua, plenty of wind turbines can been found along our town's coast; solar panels are installed at many schools by the county government. It is therefore apparent that Changhua County Government values the clean energy policy and the enforcement of such policy greatly. Although such clean energy generators are highly visible in students' daily life, our energy education still falls as dogma only. We will establish wind turbines and solar combination sets on campus to let students understand the operational mechanism of power generation equipment. We will build an aquaponics on campus to bring science and ecology to children's life by showing a living, providing access to nutritious food, and eliminating the huge carbon footprint associated with food transportation miles. The aquaponics system is a wonderful way to inspire students and engage them with core STEM concepts; moreover, the electricity generated from the power generation equipment on campus will be used to keep the aquaponics operating. Although due to geographic factors, the populations our project serve might be small, the grant would serve the most needy people. All attempts to bridge digital divide, promote carbon reduction, introduce green initiative and enhance STEM in this remote area could be put into practice only if we receive the grant.

History of organization

Houliao Elementary School was found in 1961. It is located in Fangyuan Township which is an economic weakness area comparing to other cities and townships in Changhau County. There is no public transportation, book store and stationary store here, let alone private cram school which is so common in other cities and townships. The main occupations of the residences here are labors and farmers. Parents spend long hours working to earn barely enough money to raise their families, besides that, almost 30% of students' mothers are from China and Southeast Asian countries, such as Cambodia, Indonesia, Thailand and Vietnam, therefore the parents of our students are not capable of providing enough educational resources to them and in turns leading to more and more families of economically and culturally disadvantaged.

According to the Act for Education Development of Schools in Remote Areas released on 6, December, 2017 by Ministry of Education(MOE), our school is a typical remote school. The term " Schools in Remote Areas" referred to in this Act means public schools at senior high school level or below which lack educational resources due to transportation, culture, amenities, internet access, social-economic conditions, or other factors. That definition points out the struggling learning environment our students face clearly.

We hope that by the grant from Google Data Center, children of economically and culturally disadvantaged would have more opportunities to learn technology, their digital divides could be bridges, and their STEM ability could be nourished for future job opportunities. With providing promising and challenging learning environment, we hope there is no more intergenerational reproduction in this areas.

Project narrative

In order to carry out our project smoothly and wisely, the grant can be utilized for purchasing mobile learning devices, iPAD, to let students learn coding . It is anticipated that over the next decade that there will be a massive shortfall in the number of computer science graduates able to occupy the coding careers available. This signifies the proliferation of coding into many different industries. This semester we participate in "coding plan", a program sponsored by a nonprofit foundation, to teach children to learn Scratch which is a programming language developed by MIT for young learners.6th Graders have 2 hours to learning coding every week.

The Hour of Code is a one-hour introduction to computer science, designed to demystify code and show that anybody can learn the basics. Our kids need device to master the skill, yet the computer lab is not always available to the students. With iPad, students will also learn some basic coding commands by using one of the many coding games linked on this page and available to them through their clever home page. By making use of Scratch, Hour of Code and iPad, Hauliao elementary school is committed to teaching teachers foundational 21st-century skills.

Fangyuan Township is closed to sea at the northwest of Changhua County which faces the vast Taiwan Strait in the west. Taiwan Power Company has announced plans to construct and develop Changhua wind farm off the coast of Fangyuan. The open sea off the county's coast is considered to witness the highest wind power in the entire country. Moreover, Changhua County has planted solar energy panel on more than 188 schools inside the county, including Hauliao elementary school. It's important to let students know the public energy policy and understand how the wind turbine and solar energy panel work. The grant would be utilized to purchase basic combination solar-wind power sets suitable for campus to teach students understand basic concepts of clean energy . The energy produced by the combination solar-wind power sets will use to run the aquaponics which is the third element of our project.

Aquaponics is the raising of fish and plants in a recirculating ecosystem. The fish provide nutrients for the plants. Bacteria and plants help to clean the water for the fish. Aquaponics system is a wonderful way to inspire students and engage them in core STEM concepts like Math, Biology, Chemistry and Engineering. We would develop a small-scale system using solar powered control pump and air pump in our campus.

Classes and activities planned to be implemented:

1. Applying iPAD in IT class and after-school program:
   Due to the parents here need to work for long hours to meet the finical need of their families, therefore we arrange after-school program to share the loading of taking care children. There are many activities for the children to choose, such as physical activity and art-related activity. We will teach Scratch for5th to 6th graders to learn programming, engineering and robot building. Besides that, we will introduce Hour of Code to 3rd to 4th graders to let them have access to coding.

2. get wind turbine & solar plate set and aquaponics involved in science classes:
   Applying above equipments in 3rd graders' science course" getting to know plants"; 4th graders' science course" the aquatic family-plants and animals, transportation and energy; 5th graders' science course"; and 6th graders' science course" Simple machines", "Living Creatures and Environments", the wonderful world of electricity and magnetic.

3. Holding workshops for teachers
   We understand that it is how the technologies are used for educating that counts, and not the

technologies themselves. It can be said that the teacher plays a central role in the successful pedagogical integration of technologies. New technology can pose challenges that teachers may hard to cope with if they are caught unaware. The key to successful integration of new technology or new resource in education is therefore to provide teachers with proper training.

In order to enhance teachers STEM concepts and their teaching skills , we will have in-service workshops for teachers :

a. "Computing Thinking" workshop
b. " Energy Technology Education" workshop
c." Aquaponics in Education ", the content will inclusive introduction to aquaponics , understanding aquaponics, water quality in aquaponics, design of aquaponics units, plants in aquaponics, fish in aquaponics and management and troubleshooting .
d. "GAFE(Google Apps For Education) in Mobile Learning " workshop

Description of how project addresses focus area selected above

1. Bridging the digital divide

The digital divide is not only a divide between people who have access to ICT and people who don't. It's also a divide between people who have knowledge of ICT and those who don't, between people who realize the opportunities presented by ICT and those who don't. It consists of an infrastructure gap, a knowledge gap and a psychological gap. This is the tough situation our most students whose only exposure to technology is at school face. We aware it's our responsibility to offer children access to future digital career opportunity and life. With the mobile learning device and curriculum, we hope to bridge the digital divided.

2.Carbon reduction

Aquaponics makes certain less worries of environment as there are no risky chemicals to blend, no nutrient rich waste water to dump, reduced carbon footprint and completely Organic vegetables as well as fish to which is virtually any day healthier.

3.Green initiatives

Educating children and residence of the community about energy, science and sustainability is very important green initiative. Our campus is not only a school but also a cultural and activity center of the community. What we do to build sustainability in our campus also affect our community. It's worth noting that our project integrates with the essence of equipment around our school and area. Students and residence might see the solar plates at school and wind turbine along the coast in the area, yet they might don't know the value of these green initiative. It would be amazing to let our children to understand and experience how the electricity produced by the solar and wind turbine set support the aquaponics.

4.STEM - computer science

The iPAD is introductory invention kit we can use to help our students enhance their knowledge and skills of computer science. Children use iPAD to learn Scratch , a free software from MIT which allows learners of any age to create interactive games, tell stories, make animations, and more. We believe firmly that Scratch will promote STEM education.

5.STEM - other

With aquaponics, students could conduct hands-on activities involving chemistry, physics and biology to solidify their understanding of a range of theories. Beyond standard STEM principles, aquaponics may be related to projects on sustainability, environmental science, agriculture, the food system, health, economics, business and marketing.

6.Strengthening the tech startup or entrepreneurial ecosystem
We hope strongly to help our culturally and economically disadvantaged students to see the possibility for their future life and career. With innovation and environment- friendly curriculum, they have far-reaching vision and they believe in their ideas. Students will see the world differently from others and see opportunity in depressed times, the atmosphere most students here going through in their family. We hope students will achieve social mobility.

Description of populations served and how the program addresses community needs

1. The plan is rooted in our community, more exactly, this struggling area. It takes school's need and condition into consideration, therefore it's very practical. We hope to convey the concept" thinking global, acting local" to the participants of this project.

2. All camps we hold are not only for children and parents of our school to learn something about energy, programming and new concept of aquaponics but also open to all students and parents in the area. That is, participants will be from Fangyuan Township, Dacheng Township and Erlin Township, the most remote area of Changhua County. We can spread the effect of the project with the concern of common good and resources sharing.

3. Our camps are free of charge for those students of economically disadvantaged, in the hope that their digital divides could be bridged. Being economically disadvantage children won't make children minority twice over.

4. Integrated plan in current curriculum and program allows students to have deeper and wider understanding of the related topic. Therefore, their capability on technology, energy, engineering, and computer science is to be enhanced.

Description of specific goals of the proposal and how impact will be measured and evaluated, including target metrics

Index 1: Set up a website for this project, where the content of our curriculum and goals we have reached will be shown.
Evaluation: A completed website is established.

Index 2: Held 4 workshops for teachers' professional development:
a. "Computing Thinking" workshop
b. " Energy Technology Education" workshop
c. "Aquaponics in Education " workshop
d. "GAFE(Google Apps For Education) in Mobile Learning" workshop
There will be 30 teachers for each workshop, 120 in total.
Evaluation: Questionnaires, interviews, and teaching material

Index3: 100 students and parents learning the conversion mechanism of turning solar and wind power into electricity
Evaluation: Questionnaires and learning sheet.

Index 4: Students and teachers build and manage an aquaponics.
Evaluation: A well-run aquaponics and vegetable produced from the aquaponics.

Index5: 30 students completing a Scratch program to design little interesting games.
Evaluation: practical games.

Index 6: 20 culturally and economically disadvantaged students in the community attending the camp.
Evaluation: Works and questionnaires

Index 7: 10 students with learning problems benefit from attending remedial Instruction using iPAD.
Evaluation:
Enroll and log onto the Junyi Academy Platform for learning and evaluation.
Teachers' observation on students' learning motivation and performance.

How did you hear about this program?
Through Google Data Centers Website and GEG(Google Educator Group) Changhua on Google+