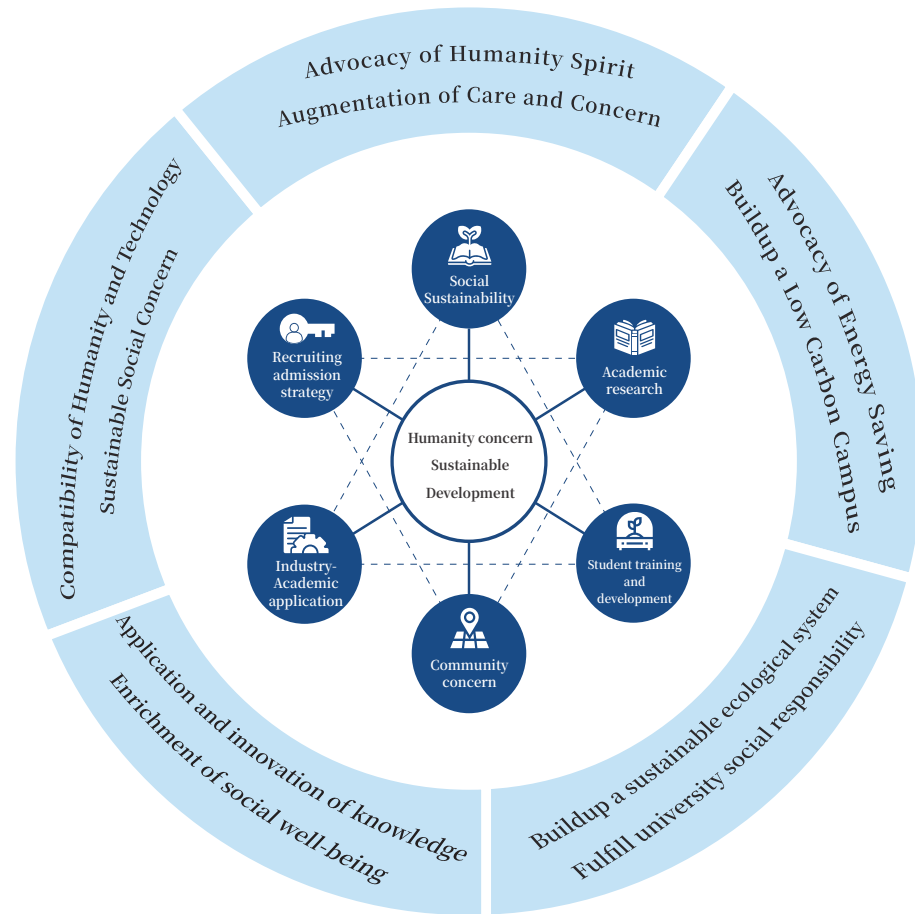


# NCU Sustainable Vision and Core Values



# Vision & Core Values

## NCU strategies in pursuing sustainable development

### 1. 6 Major Transformations



Prepare and establish the "Graduate College of Sustainable Development and Green Energy" with programs related to green energy and carbon reduction, and pooling up the technological know-how in energy saving, energy storage, and innovation.

Energy Transformation for Accelerating Carbon Reduction   

Research and develop technologies pertinent to carbon reduction and clean energy like carbon capture, carbon sequestration, geothermal power generation, etc., Integration with the SROI methodology in assisting SMEs to build up social value during sustainable transformation.

Circular Economy    

Connecting cross-field efforts in supporting the carbon neutrality goal of NCU through the buildup of the resilient infrastructure of energy saving management, greenhouse gas inspection, and green tour, etc.

Digital Revolution   

Focusing on USR topics and introduction of participating technologies in the collection and reading of real-time data from the mountainous area and coastline of Taoyuan City.

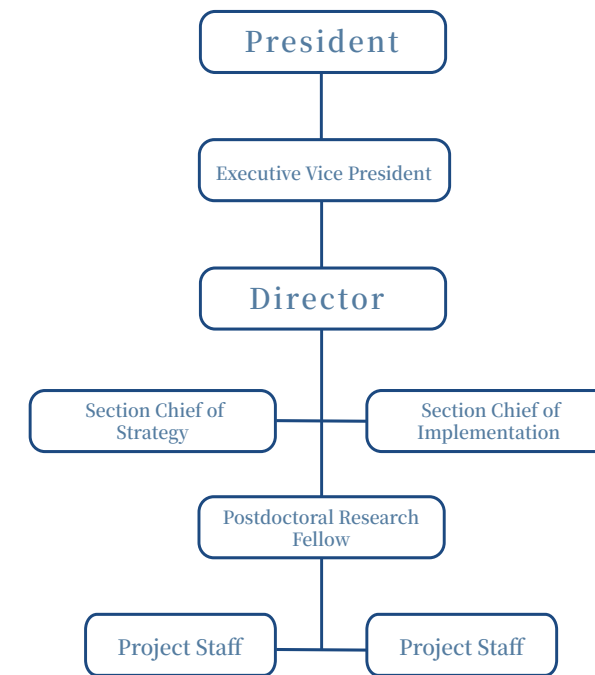
Sustainable Ecology Conservation   

Develop USR courses and field study, with the buildup of resilient environment such as disaster prevention map and diversified cultural creation industry with the local community.

Development of Urban-Rural Resilience    

Advocacy of NCU USR and affiliated universities in Southeast Asia in inter-university collaboration, such as cross-boundary air pollution monitoring and Hakka culture studies.

Cross-Disciplinary Collaboration   



## Sustainable Development Governance System

### 1. Establishment of a designated unit charged with sustainability governance and social participation: :

In combining self-positioning and professional distinctiveness, NCU seeks to realize the sustainable development goal through the study of administrative affairs, innovation in teaching, university administration, and the practice of faculties in research with the adoption of USR project as the action plan.

To achieve the aforementioned goal, NCU made the Office of Sustainable Development and University Social Responsibility as a level I Office charged with the integration of on-campus and off-campus resources for deepening the internal support system on the one hand and strengthening the linkage and collaboration with external resources on the other. NCU also seeks to provide solutions for local problems and predicaments for weaving a tightly knitted web for action through the linkage of venue for social practice and the research function of the government, industry and the academe.

The Office of Sustainable Development and University Social Responsibility of NCU consists of the Strategy Section and Implementation Section to perform the following functions:

### Strategy Section:

1. Administration of the topics of sustainable development and university social responsibility of NCU and the implementation mechanism.
2. Exploration of the humanity features of the local community and the development needs.
3. Assistance to faculty members and students in solving problems of the local community.
4. The setup of a faculty member and student support system for the implementation of sustainable development and social responsibility.
5. The buildup of a human resources bank and database for sustainable development and social responsibility.

### Implementation Section:

1. Administration of the topics of sustainable development and university social responsibility of NCU and the implementation mechanism.
2. Exploration of the humanity features of the local community and the development needs.
3. Assistance to faculty members and students in solving problems of the local community.
4. The setup of a faculty member and student support system for the implementation of sustainable development and social responsibility.
5. The buildup of a human resources bank and database for sustainable development and social responsibility.

## 2. NCU Sustainable Financial Plan

### I. Funds allocated to pursuit university social responsibility

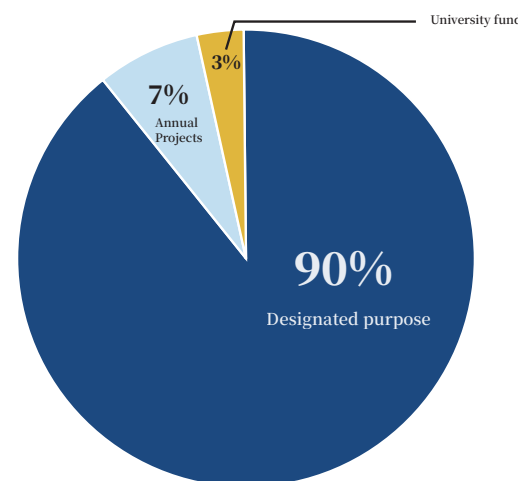
As stated in the amendment to the Higher Education Sprout Project in 2021-2022, NCU pursued its university social responsibility through its Higher Education Sprout Project funding and university funding. From 2020 onwards, NCU has allocated university funds amounting to NT\$5,250,000 (NT\$4,950,000 for 5 USR Projects and NT\$300,000 for 4 Hubs, all approved by the Ministry of Education) based on content of projects. The funding from NCU accounted for 18% of the total funding. In 2021, the Office of Social Responsibility was transformed into the “Office of Sustainable Development and University Social Responsibility”. In addition to the original annual budgeting for human resources, department expenses and project funding, the salary of a full-time assistant was added to the payroll, which accounted for approximately NT\$1,650,000 in total.

The fund allocated from the Higher Education Sprout Project to the designated office of social responsibility amounted to NT\$1,930,000 for continuing the employment of research staff for administering the USR project of NCU, organizing inter-university events of Taoyuan USR Alliance, continuing the integration of local resources for the research units of the industry, government and academia. The result of the advocacy of university social responsibility will be examined with the design and preparation of the annual report to demonstrate the impact of UCN on society.

In sum, the Office of Sustainable Development and University Social Responsibility of NCU is a level I Office charged with the integration of the teaching and research resources of NCU. The purpose of university governance is closely associated with the proper pursuit of university social responsibility in action. From cross-disciplinary development on campus to inter-university collaboration, industry-university alliance, and concerted efforts of the public and private sectors, NCU will deepen its contribution to the local community through the demonstration of its professional knowledge and the pursuit of university social responsibility to its entirety in order to achieve sustainable development.

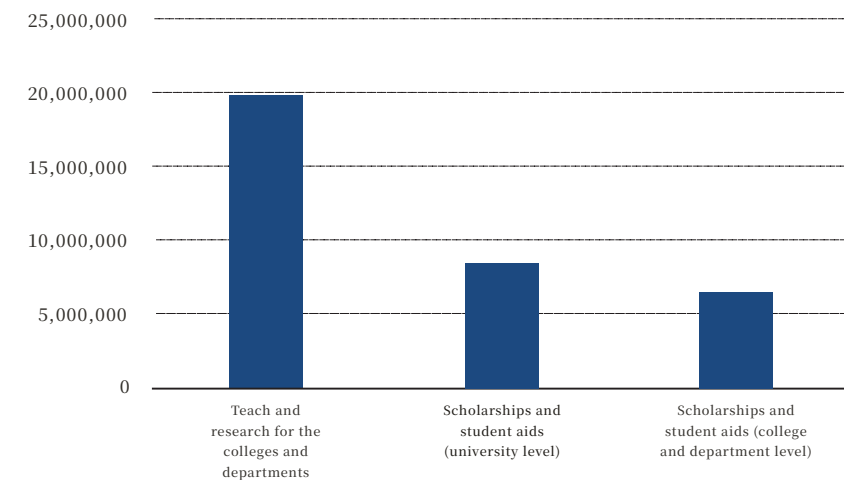
The use of funds from donations at NCU in 2020 :

- Designated purpose (90%)
- Annual Projects (7%)
- University fund (3%)

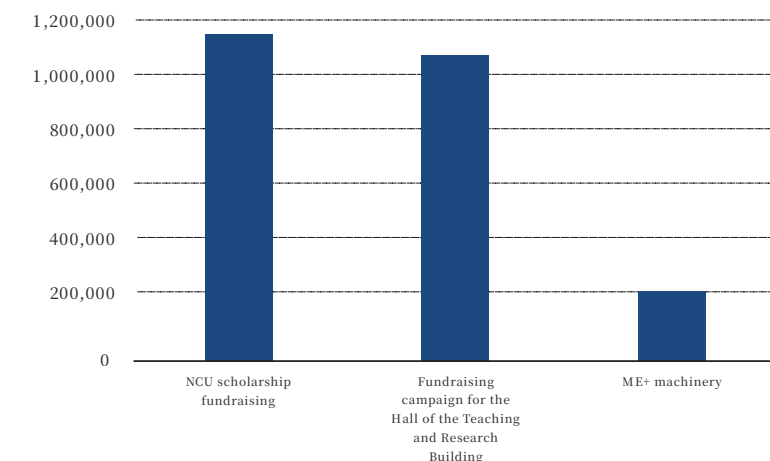


The top 3 items of expenditures of “Designated Purpose” are closely related to research and learning. The top 3 items of expenditures of “Annual Projects” are scholarships and also the major construction and academic activities at NCU of the year, which are shown in the diagram below:

Top 3 donations for designated purpose



Top 3 donations for annual projects



# Sustainable Courses and Research in Review

## 1. Sustainable Courses and Research - An Overview of NCU :

### I. Pie Chart of Sustainable Courses in NCU

NCU offered 1,328 courses on sustainability and related topics in 2021 (excluding physical education and required courses for freshman year). Each course is assigned to 1 SDG based on relevant keywords. The top 3 by ratio are shown below in ascending order:

- SDG 4 Quality Education (301 courses, 23%)
- SDG 11 Sustainable Cities and Communities (191 courses, 14%)
- SDG 14 Life Below Water (114 courses, 9%)

### II. Pie Chart of Sustainable Projects in NCU

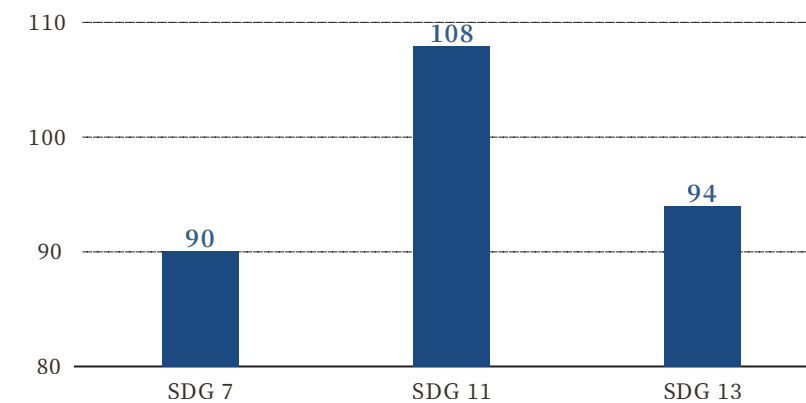
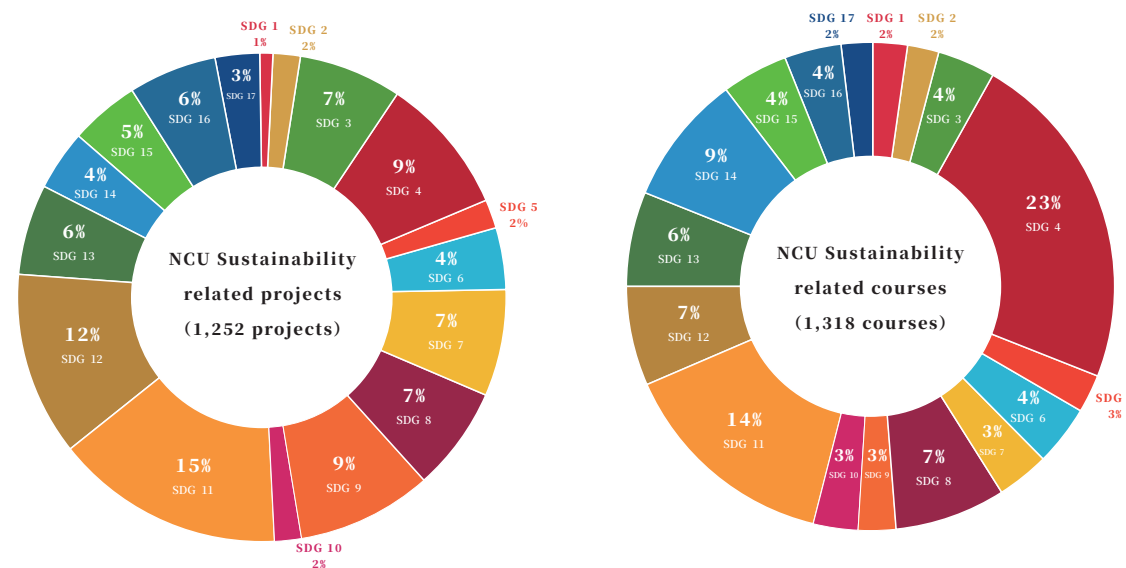
According to the R&D database of NCU, NCU has proceeded 1,252 sustainability related projects. Each project is assigned to 1 SDG based on relevant keywords. The top 3 by ratio are shown below in ascending order:

- SDG 11 Sustainable Cities and Communities (190 projects, 15 %)
- SDG 12 Responsible Consumption and Production (152 projects, 12%)
- SDG 4 Quality Education (115 courses, 9%)
- SDG 9 Industry, Innovation and Infrastructure (111 projects, 9 %)

## III. NCU Academic Publications related to Sustainability

I. After retrieving academic publications in 2021 from NCU R&D database, we sorted them by the keywords corresponding to SDGs (after appropriate adjustments) provided by THE Impact Ranking. The top 3 SDG by quantity is shown below in order:

- SDG 11 Sustainable Cities and Communities (108 publications)
- SDG 13 Climate Action (94 publications)
- SDG 7 Affordable and Clean Energy (90 publications)



# Sustainable Courses and Research Highlight

## I. Sustainable Courses Highlight :

### I. Cross-disciplinary social participation programs: College of Engineering

Cross-disciplinary social participation aims to guide students to discover problems through voluntary learning. Through the collaborative study mode with the cross-disciplinary participation group, students can propose solutions addressing related social problems, and develop the opportunity for career exploration through innovation and the practice of business startups to form the learning model of sustainable social participation. NCU instituted the regulations governing “Cross-Disciplinary Social Participation” course and program selection in 2016 to encourage NCU students to enroll in this program.

The College of Engineering makes social participation a required subject to practice USR in local community: The Teaching and Learning Development Center, Center for General Education jointly developed the Cross-Disciplinary Social Participation Program and made it a required subject in general education for students of the College of Engineering since 2018. Students can dig out social problems through their practice in the local community, based on which they can present the problem-solving strategy.

In 2021, the team of faculty and students of the NCU College of Engineering Sustainable Fuxing Project further co-organized industry innovation program for the makino bamboo industry with local organizations. The team has jointly hold 6 training lessons in a total of 18 hours on the topic of making proposal for regional revitalization projects.

In addition, the students of the College of Engineering also launched courses through social participation programs in 2021, and organized 4 events in Chang Hsing Elementary School, Fuxing District, and 1 hand-on course on energy topics in Yi Sheng Elementary School to advocating the recycling and reuse of water, how regenerated energy work and response to disasters caused by climate change among the local residents and students.



| The NCU College of Engineering Sustainable Fuxing Project team-Makino Bamboo Industry Innovation Program

## II. Yunus Social Business Centre Teaching Innovation and Practice on Social

### Enterprise:

### ① . Offering micro courses of IMPACT Map Project

The courses aim to guide students to learn SROI as the measurement of social impact assessment and interview skills, and understand the social mission and operation process of the particular local organization in depth. One course will be offered in each semester. There were 2 courses offered in 2021. Students were engaged in interviews with 9 social enterprises and non-profit organizations in Xinwu and Yangmei District of Taoyuan City, to proceed interviews on their social impact assessment and reports.

### ② . Projects on social enterprises managers

This project focused on bridging NCU team with social enterprises or non-profit organizations, so the students can make use of knowledge and expertise they learned to launch actual projects of the business sector, and proceed on their own to narrow the gap between knowledge and actual practice. The student team were engaged in a joint venture with the WDAC, an association for the improvement of women in Nepal, and dodoker in launching a fundraising campaign for helping the children of the Dalits and women in Nepal, who are the socially vulnerable in education. This “Fundraising for Dalits in Nepal” campaign allows students to learn how to raise funds for social causes. The target of this fundraising campaign is NT\$150,000, and has been achieved smoothly. The fund will be used to help women in employment and children in education in disadvantaged regions.



| Micro courses of IMPACT Map engaged in interaction with local participants (provided by Yunus Social Business Centre).



| The pursuit of “Fundraising for Dalits of Nepal” campaign by managers of social enterprises (provided by Yunus Social Business Centre).

### III. Introduction to USR related courses

In 2020-2021, NCU offered 70 courses pertinent to USR Projects, including 54 formal courses and 16 micro courses. For additional information, refer to complete version.

### IV. Teaching and Learning Development Center: Micro Course

As stated on website of Teaching and Learning Development Center of NCU, to provide students with a diversity of learning channels, students, enterprises, or units within and outside of NCU may voluntarily propose micro course to the Curriculum Division of the Office of Academic Affairs. Once approved by micro course review committee, the micro courses will be available to all NCU students to enroll. The achievements over the years are posted on the website of Teaching and Learning Development Center for viewing and inquiry. The following is some examples:

①. Reservation system for dormitory washing machine booking system

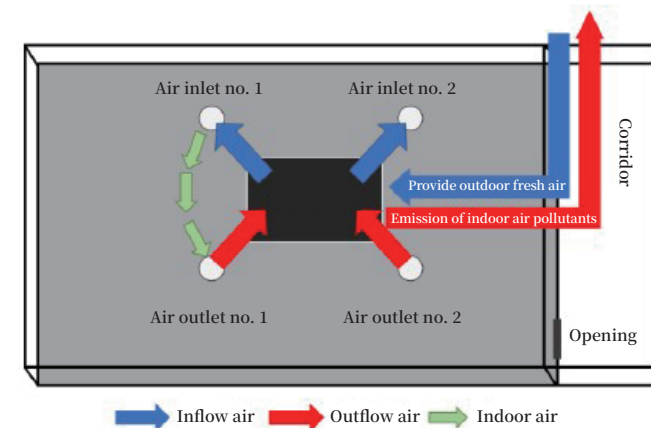
The micro course proposed by students from the Department of Information Engineering has developed a dormitory washing machine booking system to solve problem on having to wait to use the washing machines and prevent others from occupying them for a long period of time. Members of the course connected washing machines onto the internet with IoT technology and made a website, formed a database and developed an App tackling this issue. Currently, they have made a simple webpage system for users to check on washing machine using status and book their using.

①. Self-assessment of “Anxiety” - Appearance anxiety, gender and social initiative

This is a micro course proposed by students, allowing participated students to understand the essence of appearance anxiety, and explore the causes from different perspectives. In addition, this course aims to help students to build self-confidence through activities and practice, and also acquire the knowledge and skill to plan an online and offline exhibition.

### V. Taiwan Sustainable Campus Micro Course

NCU participated in Taiwan Sustainable Campus Exploration Project of the Ministry of Education in 2022. In this project, the ventilation system of the classrooms, roof-top water storage facility, and natural lighting of NCU will be examined in order to guide the students to link their daily lives and learning through action, particularly the ecological environment like water resources, air quality, and green zone in the campus of NCU, as well as the architectural planning of the campus to construct an energy efficient, comfortable, and healthy campus environment and also a database for environmental education.



▲ InflowDiagram showing the indoor circulation of air with the thermal exchange device at the basement level of the building. air



▲ Diagram (left) photograph of the basement (right)location of the air outlet opening of the thermal exchange device.

(Source of diagram: Micro course online result display)

## 2. Research Highlights on Sustainability

### I. Taiwan Earth Science Exploration Arctic Land and Sea Pilot Project

After 2 years of mutual visits and work coordination, National Central University of Taiwan and Nicolaus Copernicus University of Poland, both bearing the abbreviation of “NCU”, proposed the first domestic Earth Science Exploration Arctic Land and Sea Pilot Project for studying the earth science of two arctic zones on earth. The expected observation programs include: high-resolution glacier movement that triggered the miniature earthquake, the change in periglacial landform and in earth surface, the Arctic Ocean currents, and spatial and temporal changes of waves.

This study at Arctic Circle was conducted jointly by NCU of Taiwan and NCU of Poland. Members of Taiwan Team are Professor Chen-Hao Kuo, Assistant Professor Slawek Giletycz, and Research Assistant Cho-Kang Kuan of the Department of Earth Science in NCU. The Team headed off from Taiwan on July 30 and successfully landed on Lonyerbyen, a key location for scientific study at Arctic Circle, on August 11. They have completed a maritime buoy test and released the first seismograph of Taiwan in Arctic Circle for on-site observation. In a matter of just 6 days, they have successfully deployed 40 seismographs by walking 10 km daily with loading of heavy equipment on rugged surface of the glacier terrain to keep track of the ice quake caused by the melting glaciation. Assistant Slawek Giletycz also conducted a geological study by using UAV in photography. In this area, rock layers of Precambrian time, which was about 2500 million years ago, was exposed. This is indeed a highly remarkable zone for geological study.

In this operation, we also successfully placed 8 maritime buoys from the College of Earth Science, NCU and National Academy of Maritime Research at sea off the Svalbard Archipelago of Norway. Taiwan national flag was marked on these buoys. This is the first time that Taiwan launched its marine meteorology observation campaign at Atlantic Current zone.

This study cannot be accomplished without full support of Professor Sobota of Nicolaus Copernicus University of Poland and his team. Members of both teams also discussed on continued collaboration in the study of certain scientific topics while working together outdoors. In the future, there is room for further cross-disciplinary and cross-border collaboration. It is expected the findings of this research could be presented at International Arctic Conference scheduled to be held in Poland in November.



| The placing of the first seismograph in Taiwan: Left to right: Assistant Professor Slawek Giletycz, Professor Chen-Hao Kuo, Research Assistant Cho-Kang Kuan of NCU. (Provided by College of Earth Science)



| NCU has developed 8 maritime buoys and has successfully sent them to the Arctic Ocean. This is the debut of marine meteorology observation of Taiwan. (Provided by Professor Hua Chien)

## II. Hakka Studies-from local to international alliance

A subsidiary project of the Ecology, Living, and Economy of Taoyuan Coast Project - “Rejuvenation of Marine Hakka Culture - Daily Lives: Documentary of Hakka Village” provided the impetus for collaboration between of NCU students and the elder generation and fishermen of Xinwu. In this project, a series of photographs was taken for tracing the fishing method, culture, know-how, and folklore which otherwise may be lost forever. This documentary helps to keep the offshore Marine Hakka culture of Xinwu.

NCU team joined the Consortium of Global Hakka The Consortium of Global Hakka Studies (GHAS) was organized under the MOU signed by 11 academic units from 7 countries. GHAS is committed to emerge as a vital platform for the study of Hakka people. In addition to sharing findings on Hakka studies and the experience of Hakka movement in Taiwan, NCU team also engaged in the sharing and interactions of research findings with international academic community of Hakka studies. The team also collaborates with scholars of Hakka studies in different countries in an attempt to upgrade the quality and quantity of Hakka studies to make Taiwan the network center of global Hakka studies.

NCU team organized the online “Global Hakka Consortium 2021 Online Young Scholar Workshop” jointly with the University of Malaysia. The main venue of workshop will be the campus of the University of Malaysia and the College of Hakka Studies, NCU. A website for videoconference was also provided. Those who are interested were invited to join the workshop and discussion.



| Mayor Wen-Tsan Cheng experienced the interactive facilities inside Conch Cultural Experience Park .



| Venue of the Workshop - National Central University (provided by the College of Hakka Studies)

## III. Air Pollution Studies - from Air Quality Monitor to Cross-Border IoT

The “Air Quality Monitor” developed by Professor Sheng-Hsiang Wang and a group of students of the Department of Atmospheric Sciences made adjustment to “Air Quality Micro Sensor” and make it a display device of monitoring system for the concentration of particulates in air such as PM2.5 and CO2, and provide information to the public on air quality with indicators (red, yellow, green). A number of Air Quality Monitors have been installed in Xinwu District to form a community IoT of air pollution detection.

Due to the cross-boundary nature of air pollution, with the use of Air Quality Monitor as an opportunity, NCU entered into joint venture agreements with Chiang Mai University and Silpakorn University of Thailand, Vietnamese-German University, and VNUHCM-University of Science of Vietnam on international cooperation in research and monitoring. 3 transnational Air Quality Monitors have also been released to these affiliated schools. On receiving the Air Quality Monitors, these universities started to install the device and proceed with the monitoring of air quality. A data analysis cloud system will also be installed so the monitoring data from these universities can be uploaded real-time for cross-border data matching. After collecting data for 6 months, an international conference on air pollution was held in August, 2021 on the analysis of ambient air quality data from each location, so members of affiliated schools can understand cross-border air pollution studies better.



| UAV aerial surveillance of air pollution team training course



| An affiliated school in Thailand presented the banner of NCU



# USR Projects

## 1. USR Projects and Hubs :

### I. From Atayal Reading to Interest-Driven Tribal Learning

With Interest-Driven Tribal Learning as the main agenda, the project promotes reading, science, mathematics, and multiple-theme game-based learning in Atayal culture and computation mindset. This also helps to develop an cross-school community for mathematic learning. Through the study of themes from different perspectives and directions, students can shake off set patterns due to past experiences and present greater potential in indigenous education.



| After-school counseling for students from Kui Hui Elementary School through online meeting

### II. Sustainable Fuxing – Building Smart and Resilient Tribes

This project aims at strengthening the capacity of Fuxing District in disaster prevention, readiness, response, and recovery in resilience on the basis of 4 sub-projects “Smart Disaster Prevention”, “Smart Energy”, “Sustainable Water”, and “Tribal Revitalization”. Through smart disaster prevention, the community can be ready to develop smart energy and sustainable water before disasters. It also helps to strengthen the ability to respond to disasters. Tribal Revitalization is the capacity developed by tribes before disaster, and also the foundation for post-disaster recovery and sustainable development.



| Home-made soap by students f Chang Xhing Primary School from dumped oil.

### III. Art Immersion and Sustainable Community - Foundation-building and co-prosperity of the local culture in Zhongli and Pingzhen

The anchor of this project is the introduction of resources from public sectors for rooting local arts and culture while developing humanity accomplishment and social concern for the revitalization of local community sustainability. In the rooting of arts and culture, the project has aggressively vitalized and preserved local heritage of Pingzheng and Zhongli Districts, inherited and developed Hakka culture, while linking with artistic and cultural events through cultural diversity. The project aims at the realization of ethnicity and art of living in the community through the interwoven social and cultural context. In environmental sustainability, a professional platform for improvement of tribal clustering of local residents, a sense of belonging is nurtured. This platform also allows local residents to participate in local community affairs, which will help to enrich their knowledge and understanding of environmental protection and care for physical and psychological health of local community. Accordingly, a local community interactive network could be built and community sustainability could be achieved.



| Children participating in exploration and creation workshop of illustration books

#### IV. Ecology, Living, and Economy of Taoyuan Coast – Facilitating the Sustainable Development of Taoyuan’ s Coastal Environment and Culture

The coastline of Taoyuan has suffered from air pollution and erosion due to climate changing threats. This project aims at creating a green corridor along the coastline of Taoyuan in trinity (ecology, living, and economy) for the revitalization and sustainable development of local environment and community. The spirit of sustainability is extended through international connections with partners vulnerable to climate change (severe air pollution, drought and flood), such as Thailand, Vietnam, Indonesia, and Bangladesh. With the assistance of training courses and actions taken by partners in response to the threat of climate change (environmental monitoring, disaster prevention and reduction) the resilience of these partner countries in responding to disaster and recovery after disaster have been augmented.



| Ecology, Living, and Economy of Taoyuan Coast - field study of students visiting “Taoyuan Coastline Green Corridor”

#### V. Reengineering of Yangmei District's Social Value Project

The local organizations in Yangmei District, Taoyuan City lack the ability and training to apply technology and are also deficient in accumulating organizational data and presenting their influence in new media forms. This project aims at Yangmei District from the perspective of cultural diversity via “Start locally with a global view” , and the enterprises in local community act as incubator. The transmission and the influence of social charity value will be used for the assessment of management of action strategy for advocating the reengineering of social value and influence of Yangmei. The university's social responsibility aims at training and development of talents, local talent retention, and improving the opportunity for community sustainable development under the model of “Education of people, community linkage, and social innovation” .



| Students proceeding field study in Fugang Community and interact with local residents

#### VI. Oceanic Sustainable Development

The problem of buried industrial wastes and pollution by heavy metals is critical at Xinjie River and Caota Sand Dunes areas of Taoyuan Coast. These pollutants left have caused perpetual threats to ecological environment and disturbed daily lives of residents of Taoyuan Coast. It’ s time to seek a solution proactively for this critical pollution problem. Under this project, the investigation at the outlet of Xinjie River and Laojie River has been completed under the earth resistivity method in 2020 and 2021, respectively.



| Students deploying monitoring equipment on the outskirts of urban areas.

### VII. Climate change on the table

The main objective of this project is to change the dietary habits of consumers, starting from their daily lives and proceeding to affect the food culture, consumption market, and natural environment. Additionally, the project aims to inspire a trend within community. This project will inspire younger generation with the concept of sustainability and shake off the yoke of the existing diet habits. It is expected that the concept of food and lives among the students could be enhanced, and those changes would also affect their families, the campus communities, and online communities. In 2020, the main focus was on practical investigations and integrating and organizing various institutions and units. The project collaborated with local rural communities and local non-profit organizations, and the course "Green Industry and Local Society" was designed to help deepen the concept of sustainability. In 2021, the main focus was on cultural creativity teaching, with the development of SNS accounts for local community, and creative writing and photography.



| Participation of the local community in sustainability related courses

### VIII. G5 Socio-scientific Sustainability Curriculum Design for Primary and Secondary Schools

The “G5 Socio-scientific Sustainability Curriculum” micro course offered under this project aims at guiding university students to understand SDGs, the educational design and action area is primarily focused on the Atayal community in Fuxing district, Taoyuan City. Design demonstration courses are conducted and actual teaching is carried out. It will be followed by the promotion of education for the teachers at high school and primary school in public demonstration synchronously, to pass-down the practice and application of innovative teaching. The project collaborates across departments to offer courses that lead university students to understand important SDGs environmental and ecological development issues in the surrounding areas through remote sensing systems, and then design cross-disciplinary learning camps and courses for elementary and middle school students with a focus on literacy. The aim is to convey important issues, take root at the grassroots level, and take personal growth and environmental sustainable development actions in the future. Training of teachers will start next year. Through university students' open-to-public teaching and teaching design explanations, guiding and flipping the mindset of rural teachers, and spreading positivity through the action of frontline teachers.



| Discussion on the design of teaching materials in the micro course by NCU students.

### IX. Impact Entrepreneur Lab

Taoyuan City is taken as the site for this project. Local problems will be addressed through the focal group visits and interviews for setting up the Impact entrepreneur Lab as the main axis to stimulate responses to local issues and business models. Impact assessment of the benchmarking social enterprises and non-profit organizations will serve as the focus of this project to guide NCU faculties and students to take part in social participation.

In this project, NCU students were recruited for “Impact Entrepreneur Lab” student team. Team members are expected to enrolled for 1 academic year. They were trained for professional knowledge and develop related skills, and conduct field studies on social impact of local organizations. The project aims at developing abilities in project execution, narrowing the gap between academic knowledge and practical action, and strengthening their competitiveness in employment.



| NCU students proceeding telephone interviews

## 2. Awards and Recognition

### I. 2020

- ① . NCU ranked 5th place among major public universities by USR University Citizen Survey, CommonWealth Magazine
- ② . NCU USR Project - Ecology, Living, and Economy of Taoyuan Coast – Facilitating the Sustainable Development of Taoyuan’ s Coastal Environment and Culture, Taiwan Corporate Sustainability Awards (TSCA), – Bronze, University Sustainability Plan
- ③ . Incentives for solar photovoltaic power generation equipment, Ministry of Education (National university with outstanding performance on rooftop photovoltaic equipment - total capacity - Colleges and Universities Group- the Honorable Mention Award).
- ④ . Inter-school competition of resources recycling, all levels of schools in Taoyuan City - Class A.

### II. 2021

- ① . NCU ranked 4th place among major public universities by USR University Citizen Survey, CommonWealth Magazine
- ② . “Step into the world of bees and enter Jiudou of Xiwu with illustration books” , NCU USR Project - Ecology, Living, and Economy of Taoyuan Coast – Facilitating the Sustainable Development of Taoyuan’ s Coastal Environment and Culture, Sustainable Environment Spotlight Story Award, 2021 USR Online Expo
- ③ . “learning hand-in-hand to make indigenous children smile with mathematics” , NCU USR Project - From Atayal Reading to Interest-Driven Tribal Learning, local community spotlight story award, 2021 USR Online Expo
- ④ . “Beloved, Joint Creative Art Festival Brand Supporting Plan” , NCU USR Project - Art Immersion and Sustainable Community - Foundation-building and co-prosperity of the local culture in Zhongli and Pingzhen, Cultural Sustainability Spotlight Story Award, 2021 USR Online Expo

### III. 2022

- ① . NCU ranked 3rd place among major public universities by USR University Citizen Survey, CommonWealth Magazine
- ② . NCU USR Project - Ecology, Living, and Economy of Taoyuan Coast, Asia-Pacific Sustainability Action Awards 2022 - Gold Award of Taiwan Sustainability Action Award, and Silver Award of the Asia-Pacific Sustainability Action Awards.
- ③ . NCU USR Project - Art Immersion and Sustainable Community Asia-Pacific Sustainability Action Awards 2022 - Silver Award of the Taiwan Sustainability Action Awards
- ④ . National Sustainable Development Awards 2022 -Education Genre



The NCU USR project, “Ecology, Living, and Economy of Taoyuan Coast” won the Spotlight Story Award, USR Online Expo 2021, Ministry of Education (source: USR Center, Ministry of Education).



Eugene Chien, Chairman of Taiwan Institute for Sustainable Energy (TAISE) presented the award to NCU representative (left: Vice President Shang-Yao Yan, and right: Chairman of the Department of Earth Sciences Horng-Yuan Yen).

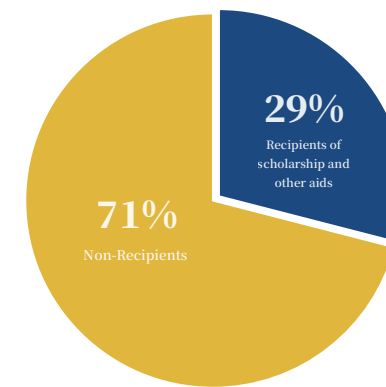
# Sustainable Campus

## 1. Multiple entrance programs and caring for the disadvantaged: :

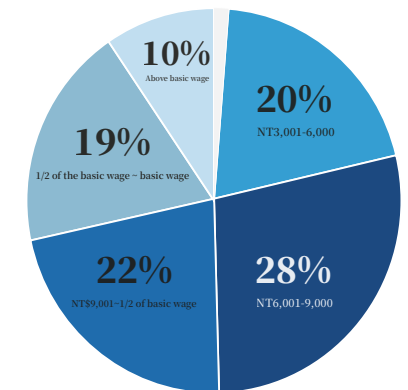
NCU provides multiple entrance programs regarding admission of students and examination service support. According to the university fund performance report in 2021, NCU offered the following channels for disadvantaged students for admission:

- ① . Each department gives priority to disadvantaged students for admission through multiple entrance programs. There is also the “Sunflower Admission Program” through which students can be admitted in priority. In 2021, the Sunflower Admission Program offered 39 vacancies for students to apply for admission (increased by 5.41% from 2020). Through the interview with the homeroom teachers and the submission of learning reports each semester, the university administration expresses concern for the learning of these students and provides timely counseling. In the Star Plan and personal application channels, additional vacancies have been allocated to indigenous people since 2015 on an annual basis. In 2021, 33 vacancies were allocated. In addition to appropriate means of scoring, the standard for admission will be adjusted downward depending on the situation. In 2021, 42 vacancies were allocated for the admission of students with special skills (increased by 31.25% from 2020). Some departments and areas of specialization of the departments admitted students with different education backgrounds as top priority. There were 37 students enrolled in 2021 of whom 5 were new immigrants and their children, 1 indigenous people, 3 disadvantaged students, and 6 students from experimental education.
- ② . A waiver of application fee of 2nd stage of admission by individual application is offered for students from low income or disadvantaged families with 60% off the original fee, and free for students from misfortune families and indigenous people. Students taking the admission examination may lodge at NCU Hotel for the day before the examination at a 50% discount for lodging and free parking. Students with special skills applying for admission to the bachelor’s degree programs and applying with the Sunflower Admission Program are subsidized for their traveling expenses caused by interview. In 2021, 63 disadvantaged students were subsidized. The funding for the sunflower scholarship and student aid augmented since 2019 under the donation of Madam Chiu-Hua Lo, TSMC Foundation, the Higher Education Sprout Project and other donations of NCU. Each recipients of the sunflower scholarship receive NT\$400,000 (NT\$100,000/year) from the previous level of NT\$240,000 (NT\$60,000/year). The goal of supporting disadvantaged students has been achieved.
- ③ . About 29% of the NCU students in enrollment are supported by scholarships and other aids, while monthly amount received by each student falls within the range of NT\$6,001 to less than half of the minimum wage, which is shown in the diagram below:

The proportion of students receiving scholarships and other aids to the total number of students in enrollment

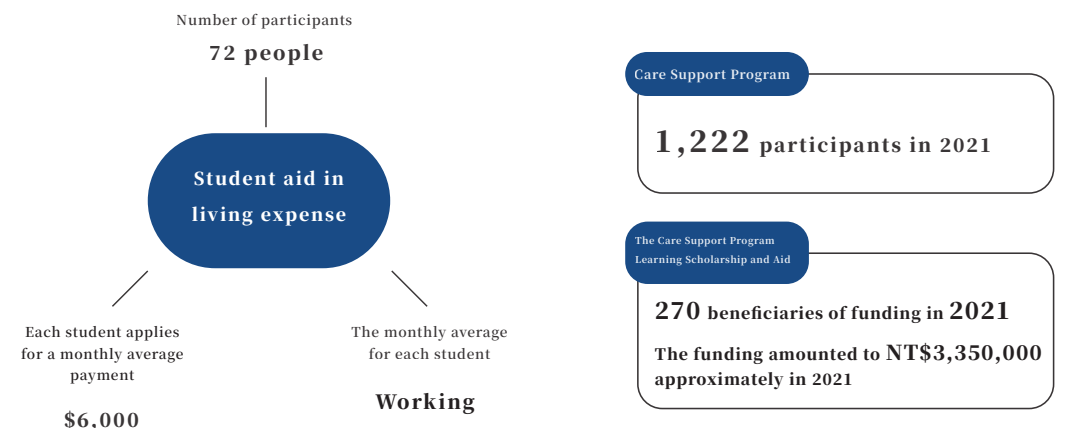


Monthly payment per student (scholarship and other aids)



NCU also holds the “Higher Education Sprout Project - Making Higher Education a Social Cause” and allows disadvantaged students to concentrate on their studies and normal daily lives through the regulation of “study, not work” . The disadvantaged students no longer have to work part-time which may hamper their time for studying.

As stated in NCU fund performance report, 2021, the “Care Support Program” developed with 1,222 participants in 2021. The “Care Support Program Learning Scholarship and Aid” encouraging studying in lieu of part-time work successfully helped 270 participants of the program in 2021, with total funding amounting to NT\$3,350,000 approximately. Affected by the spread of COVID-19, the progress falls behind schedule due to the difficulty in promotion by physical means. Related online operation and consultation cannot effectively serve the cause, or delay in serving the cause also contributed to the undesired outcome.





((Photograph by Ju-Chi Chen))

## 2. Low-carbon environment: :

### I. NCU is the pioneer of sustainability and declared to achieve 100% carbon neutrality by 2050

National Central University is the first university in Taiwan to make “Sustainable Development” the general goal of its curriculum for teaching and research. NCU proactively supports international Net Zero Emissions consensus of sustainability, and advocates for carbon reduction in the campus. In the “Sustainability and Carbon Removal Technology” Forum organized by NCU on February 16, 2022, President Jou Jing-Yang and executive officers declared carbon neutrality on campus at 50% by 2030, and the objective of carbon neutrality at 100% will be achieved by 2050.

According to President Jou Jing-Yang, most countries have signed the “Paris Agreement” in 2015 in response to the threat of global warming and climate change as an effort to advocate the policy of carbon reduction. The objective is to control the rise of global temperature within 2°C. The 26th UN Climate Change Conference, which concluded in 2021, was the first time that the idea of “incremental reduction of petrochemical fuels” was added into an official document. Governments and enterprises all over the world have made commitments to achieve “Zero Carbon Economy” as the core.

NCU classified greenhouse gas into 3 scopes in accordance with the Greenhouse Gas Protocol for the management of direct emission and indirect emission of greenhouse gas, and launched the campus carbon reduction plan. Under this plan, carbon neutrality on campus shall reach 50% by 2030 and 100% by 2050.

NCU launched carbon neutrality under the “voluntary” inspection, and seeks an objective and impartial third party to validate the carbon reduction on campus. In the future, the practice of carbon reduction will be presented in the annual publication, “NCU University Social Responsibility Annual Report”, to review the result of carbon reduction annually.

Deputy Minister Wen-Sheng Tseng of Ministry of Economic Affairs, who was invited to this forum, mentioned that he was glad to see the self-commitment of universities to a daring goal of carbon reduction. NCU has a prestigious College of Earth Sciences in Taiwan, and the advocacy of carbon reduction plan and energy regeneration is closely associated with the global environment. He is confident in NCU for this cause. He emphasized that carbon reduction needs the policy making of the government, the design of the control goal, the voluntary effort of the industrial sector, and nurturing of talent by educators in general. He expects the industry and academia circle can work in collaboration with the government for the best of sustainable development in Taiwan and on earth.

In this “Sustainability and Carbon Removal Technology” Forum, the Deans of the School of Management, College of Earth Sciences, College of Engineering, and College of Electrical Engineering and Computer Science demonstrated the progress of NCU in ESG and social impact, clean energy, net zero carbon emission, circular economy, energy efficiency and related professional areas. Influential representatives from the industry, government, and academia circle were also invited to share the expectation to speed up carbon removal in the net zero game for alignment with the trend of green economy.

NCU started to take action on campus carbon neutrality since February 16, 2022. The Office of Sustainable Development and University Social Responsibility is responsible for the coordination and planning for linking the administrative units of NCU at all levels, the formation of on-campus carbon inspection system, and the advocacy of the participation of faculties and students in action of sustainability and carbon removal.

The Office of Sustainable Development and University Social Responsibility invited a third-party institution recognized by the government to hold 16 hours of training on July 18-19, 2022 (the GHG Internal Auditor Basic Training Course) for the preparation of carbon inspection on campus, to equipped staff members with related knowledge. About 30 representatives from different functional units were arranged to attend the training course.





(Provided by the Construction and Maintenance Division, Office of General Affairs)



(Photograph by Ru-Chi Chen)

## II. Installation of Photovoltaic Power Plates for an eco-friendly campus

In the uprising of green economies worldwide, NCU takes “Sustainable Social Development, Improvement of Well-Being for Mankind” as the essential objective of education. In supporting the government advocacy of the photovoltaic energy program, NCU makes the most of its resources on campus by setting up photovoltaic power installation at 2,642 kWp capacity. It is expected that over 50,920,000 kWh of electricity could be generated in 20 years, which helps to reduce the emission of carbon dioxide by more than 26.53 million kg. This indeed is one of the objectives of NCU in shaping one of the eco-friendly campuses in the world.

In supporting the 2-year plan of the Executive Yuan in advocacy of photovoltaic energy, and the Project of Energy Saving and Carbon Reduction on Campus Advisory Team launched by the Ministry of Education, NCU planned to check all the space in buildings on campus, to exclude buildings with no feeding line capacity, seriously covered and inadequate support in structure from photovoltaic generators installation, featuring insulation and cooling effect, and increase school revenue. It also helps to reduce the energy consumption for indoor air-conditioning for saving energy and expenses for the electricity bill.

During the installation of facilities for photovoltaic power generation, NCU received assistance from the Ministry of Education and the solar energy consulting groups in the procurement procedure under applicable legal rules. The photovoltaic energy installation in place can generate 2,630kWp of electricity on rooftop, and 12 kWp on ground level, which make up a total of 2,642 kWp. It is expected that about 50,927,218 kWh of electricity can be generated in 20 years, which helps to reduce the emission of carbon dioxide by approximately 26,533,080 kg. The feedback from the users is positive, particularly the installation of the photovoltaic plate can help to fortify the durability of water resistance. Likewise, the temperature under the TWD index also fell by 3 to 5°C. The effect is obvious.

Targeted at green campus, NCU will further assess the space for the installation of photovoltaic plates on campus in order to increase the capacity of solar energy, and do the best for sustainable development on earth.

## II. Sustainable Force in Commuting - E-scooters

The campus of NCU covers a vast piece of scenic land. Although Ubike has been established as a common means of transportation for all, both faculties and students are in high anticipation for E-scooters. The introduction of E-scooters on campus provides another option of transportation, improves the quality of traffic on campus, and also helps to solve the problem of messy bike-parking. According to President Jou Jing-Yang, the introduction of E-scooters to campus is consistent with ESG objective of NCU of “carbon neutrality by 50% in 2030, and 100% by 2050” .

There are a total of 10 public E-scooters locations on campus: two sides of the pond at Male Dormitory #9, in front of the library, Pine Cone Restaurant, Late-Night Snacks Lang, Female Dormitory #1-4, Pine Garden Restaurant, Engineering Building #5, Yi Ren Hall, Zhong-Da Lake, and General Education Building. In the trial period, 54 E-scooters will be available for leasing. Each E-scooter is 20 kg in weight and with a maximum loading of 100 kg. It can climb up slope of 12 to 16 degree with a maximum speed of 15km/hour. Users just need to download the app on their mobile phones to get and returning the vehicle and payment very easily for the time being. It is really convenient. In just one week, 3,500 faculties, staff and students have registered for membership. The feedback is positive.

## Student Sustainable Research Project -- Case Study on the Winning Teams of National Central University Competition on the Topics of Social Innovation Practices, 2021:

### 1. Distinction Award: Innovative Digital Board Game Development Program Regarding the Regional Revitalization of Xinwu

The Game Creating Society of Xin Wu Senior high school is a senior high school student organization committed to regional revitalization. Through on-site study and board game design, students translated local features into an entertaining game for educational promotion. The NCUGameCreator is a self-motivated learning group dedicated to digital games development, and apply the skill to certain social topics for educational advocacy. The goal of this program is to train senior high school students to further develop board games with local features into digital games through the programming, with a view to make contribution to the promotion of local features.

### 2. Merit Award: Honey Bee Sweetie

“Honey Bee Sweetie” , an illustration book on food and agricultural education presented in Chinese, English and Hakka language, was jointly published by “Easy Market in NCU” and “Sowreapd” , two NCU student communities collaborated with Chia-Hsin Yang, a student of Department of Commercial Design at Chung Yuan Christian University. This book tells stories of beekeepers in northern Taiwan collecting honey in the south, and the ecological change under environmental change. The purpose of this book is to promote the education of local culture, and introduce the knowledge of food and agriculture related to bees.

### 3. Achievement Award: A Tour at the Market, Re-presenting Xinwu

Sowreapd is a local publication based in Xinwu in an attempt to make local inspiration through writing, and keeping an eye on local people and features constantly, trying to understand different aspects of Xinwu through various modes. With care for people and land, it is hoped that this care will not only be expressed in words, but also deeply rooted in the heart.

Three issues have been published so far. A micro course is introduced to allow NCU students to link with the local community to make Xinwu revive.

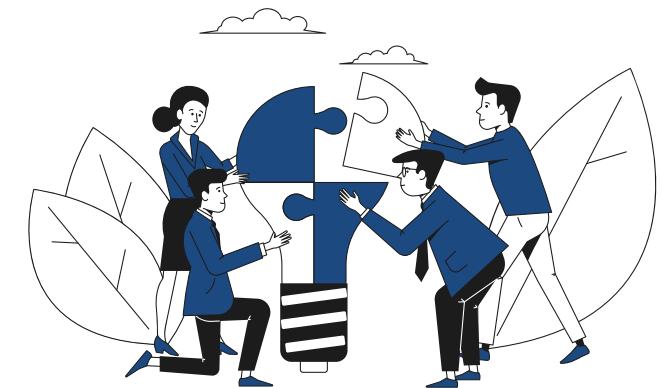
### 4. Achievement Award: Is it okay without being good looking? - Exploring the development of BDD of students

This topic focused on “Body Dysmorphic Disorder” (or commonly known as BDD). The concept of BDD is used to characterize many users with perceived defects in their physical appearance. Excessive attention to one’ s physical appearance and the lack of confidence affect different aspects of our daily lives.

To convey our goals and ideas more accurately, we have considered elements such as interactivity and experiential design. As such, we chose images and audiovisual exhibitions to provide viewers with a different kind of experience, to let them understand the diversity of beauty and sent a message that physical appearance should no longer be a cause of anxiety.

### 5. Achievement Award: The use of wearables to forecast strokes and the development of a mobile health management system

The research focuses on the method of using wearables and monitored learning technology to determine if there is abnormality of irregularity and asymmetry by monitoring our routine actions. The data will be analyzed to determine if there are possibilities to be signs of imminent stroke. In combination with the health management app and alert function of abnormality, hopefully we can give early warning of an imminent stroke.



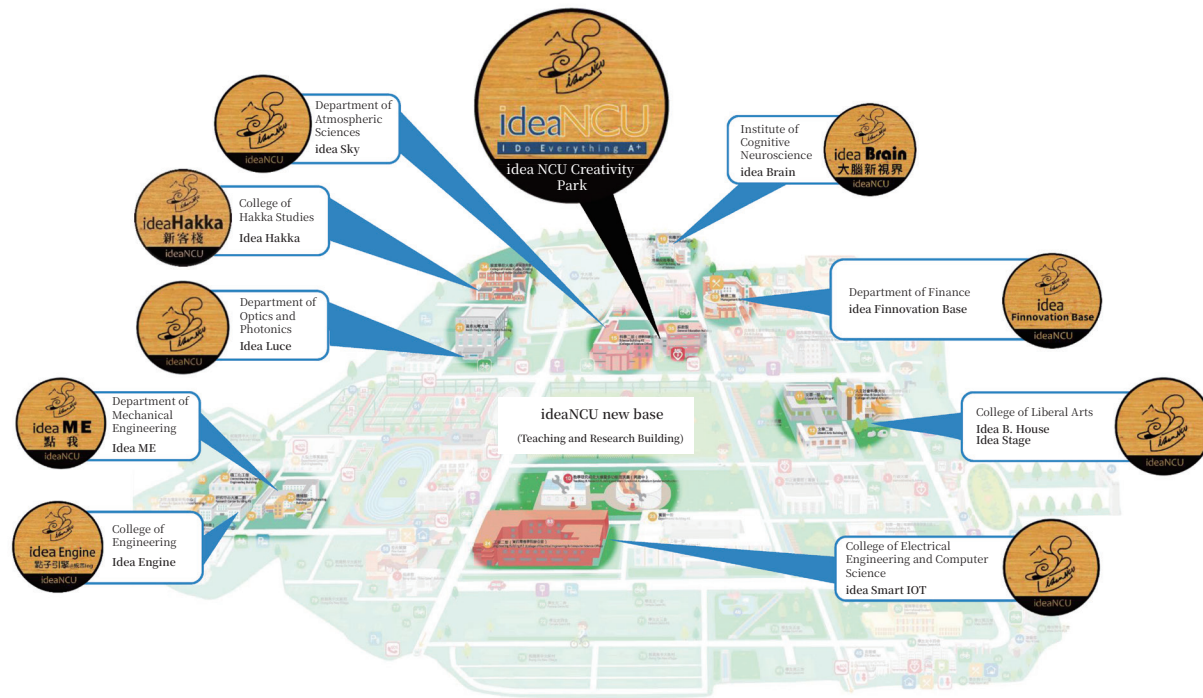


# Student sustainable activities

## 1. Self-Motivated Learning Group

What is ideaNCU?

ideaNCU was established to encourage students to extend what they learned from class, to think outside the “box” of department and college, and connect what they learned with topics in their daily lives in order to develop self-motivated learning, issue analysis, creative thinking, cross-disciplinary integration, problem solving by action, thereby applying the professional knowledge or practical skills they learned to generate creative solutions for social issues.



Locations of ideaNCU space on campus

## I. Gender NCU

This group was formed in the fall semester of 2020. Which aims to create an action-oriented, gender-friendly community. This group gathers students with interest on gender issues and focuses on the situations commonly seen in university, and thrives to make the campus a gender friendly environment. The purpose is to enhance gender awareness on campus through actions.

## II. Easy Market in NCU

During the early stages of Easy Market in NCU's establishment, the aim was to promote local young farmers in Taoyuan. They wanted to make good use of the advantage of having many families with children visiting NCU during holidays, by recruiting young farmers doing "organic farming" or "eco-friendly farming" to solve their problem of insufficient marketing. The 3rd term of Easy Market in NCU organized “NCU Picnic Day” with the collaboration of local young farmers with a focus on community development. On the one hand, it promotes the products and ideas of young farmers and stall vendors, bringing in crowds to increase their sales. On the other hand, it uses activities and issue participation to influence the purchasing habits and thinking of people and tourists in NCU neighborhood. The latest (4th) term of Easy Market in NCU hopes to continue organizing markets with "culture" as the main theme, and cooperating with Indigenous Student Resource Center and the Office of International Affairs. In addition to allowing parents and children who visit campus on holidays to experience cultural events, it can also allow the school's indigenous groups or foreign students to participate and experience the markets together.



| Activities of Gender NCU.



| The Bazaar organized by Easy Market on NCU campus

### III. NCU Green

This group dedicated to the promotion of plant-related knowledge. Through the accomplishment of NCU Green Garden Map, it enables group members to understand the plants at NCU better. Furthermore, the group utilized horticultural therapy to let NCU students understand that gardening can help to relieve stress. It also helped students to gain more knowledge of plants through different activities. The topic of net zero carbon emission was presented by the end of semester with sharing actions related to net zero, such as how home gardening can effectively reduce carbon emissions.

### IV. NCU Nature

The only group existed due to common interest of sustainability and environmental protection. The group concerned about ESG, climate change and other environmental topics. The activities of the group are mostly topic-oriented, such as climate policy initiatives, climate education, and green career. They challenge new issues every semester to accumulate experience and knowledge on climate change topics, and hope that their action can inspire more young people to stand up together to tackle the problem of climate change.



| NCU Green course



| NCU Nature course

## 2. Volunteer Service Team

### I. WE CARE environmental education

Student volunteers of WE CARE aims at taking actions on environmental education, promoting general science education and charity service. It organizes related activities of environmental education with public sectors and NGOs, and encourages faculties and students to participate. The achievement over the years is the nationwide removal of mile-a-minute weed to protect land ecology.

## 3. Student Club

### I. NCU Diving Club

This club is founded by a group of diving lovers. Albeit bearing the title of Diving Club, the members are also very curious about everything concerning the sea. They dare to try all kinds of activities, such as diving, surfing, SUP, and even beach cleanup.



| WE CARE environmental education team engaged in the removal of mile-a-minute weed



| Beach cleanup campaign of the Diving Club

## Alumni/Student Sustainable Startup

### 1. Tempest Digital Ltd.

Tempest Digital Ltd. was found by a group of young people from different areas of specialization. They are dedicated to making “games not just games”. The Chief Executive Officer is the former leader of NCUGameCreator (2016-2018), who established this company with his partners after graduation. This company gathered talents of planning, programming, script writing, art, audiovisual, teaching and event planning. Starting off with game production, it further transcended into digital content, exhibition planning for education units, innovative teaching and gamification. It is dedicated to find a solution for the gap between industry and academic through the power of digital technology. The company hopes it could provide a good channel for the students to absorb practical experience in the business.



| Tempest Digital Ltd. gave presentation on international webinar of regional revitalization

### 2. Thoo Design

“Thoo Design” participated in the 4th Taoyuan Social Enterprise Startup Contest. The co-founder of the group is Chia-An Yeh, an alumnu who graduated from the Department of Earth Sciences. He was once lost and wandered on his path of education, which allows him to empathy economically-disadvantaged teenagers. Therefore, he determined to take action, started off offering training opportunities to economically-disadvantaged teenagers based on his specialization in graphic design, and design co-name cultural and creative product for charity groups. He turned these teenagers from people who needed help, to people who can help. The brand new “Time-for-discount” (offer discount to client who’s willing to commissioned economically-disadvantaged teenagers for graphic design) and training programs won the award of “second runner-up”. In addition, Thoo Design team also thrives on cooperating with public offices in holding sustainability related workshops, including the “Design to reduce plastic” workshop which promotes plastic reduction and waste-reuse, and “Sustainable and recyclable fashion” workshop which promotes sustainable fashion, as advocacy of waste reduction in daily lives.

### 3. Justin Bike Studio

The orange container truck seen nearby the Late-Night Snacks Lang is the Justin Bike Studio. This place aims at providing students with the best biking experience. The physical store (the owner Justin started as one-call-away service without actual shop) has been opened for 4 years and has incrementally earned the trust of NCU faculties and students. The Justin Bike Studio not only provides regular repair and maintenance, but also sells second hand bicycles. The business philosophy of this place is “treat a valuable vehicle as it deserves, not as a scrapped piece of iron”. The selling price of second-hand bicycles is usually just enough to balance the cost, and the profit margin is surprisingly low. Yet, Justin Bike insists on this service. For example, between taking only 4 minutes in “replacement of parts” (which only cost 4 minutes) and “repairing” (which would cost 40 minutes), Justin prefers the latter. He believes in making the best use of everything and reduces waste to minimum. This is indeed the conscience and the professionalism of this place.



| Thoo Design organized the “Design to reduce plastic” workshop



| Alumnus Justin is repairing bicycles for customers (photo by Yu-Chuan Chen).