Design for Global Health Competition

2025

SIGHT PHILOS HEALTH

Sponsored By
Seal of Love Charitable Foundation

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Competition Brief

香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Competition Overview

The **Design for Global Health Competition**, organized by SIGHT (Student Innovation for Global Health Technology) at the Hong Kong University of Science and Technology, is an exciting opportunity for students to tackle pressing global health challenges through design thinking approach. This international health innovation competition invites global teams made of 2-5 people from the Asia Pacific Universities to develop innovative and data-driven health solutions for the selected communities.

Aligning with the university goals of experiential learning and SIGHT's mission of deploying data collection and management technology for effective impact analysis on health-related programs on communities with needs, we encourage participants from all disciplines to collaborate and provide ideas on global health challenges. (For details about registration and competition, please see the Competition Rules.)

Health Challenges in Jagna, Bohol Island, Philippines

Bobol Island is famous for its picturesque natural scenery including chocolate iconic hills, pristine white-sand beaches and rich natural resources.

Jagna is a coastal town in Bohol where the local economy is driven primarily by agriculture, fishing and small-scale industries. It has a growing tourism sector that takes advantage of its rich cultural heritage and scenic coastal areas. However, the rural setting presents economic challenges. The annual income per families in Philippines is 326,940 pesos (5900 USD) in which the majority economic activities rely heavily on primary industries (PSA, 2024).

Healthcare, in particular, is a pressing concern. As Jagna's medical facilities are often under-resourced, many residents rely on limited primary health care facilities or distant urban centers for advanced care. According to the government health data on the Central Visayas region, where the municipality of Jagna is located, the most common ones that are seen are upper respiratory diseases, hypertension, diabetes, skin disease and infections. Besides, there are frequent outbreaks of dengue fever and tuberculosis in specified periods such as the aftermath of natural disaster and hot and rainy months.

In general, there are two challenges to receiving care. First is access to care. The limited services that are available require long travel for many residents, compounded with the lack transportation, make it difficult to utilize these services. The medical services are

scarce. There is only one doctor who provides care for the indigent people. There is no testing capability for patients who might have diabetes. The other challenge that most residents have is the lack of financial resources to pay for the care. For example, when patients are told that they have hypertension, that may not be able to access medicine because of the shortage of supply. They are then referred to a community pharmacy where they cannot access the medicine because it is too expensive.

The findings underscore a fragile healthcare system in Jagna. The local primary healthcare system that provides basic chronic illness programs is insufficient. In particular, children and low-income families face the deepest challenge, making the enhancement of accessible, comprehensive healthcare services an urgent priority.

Philos Health

Philos Health, a small volunteer-run NGO, founded in 2004 by Mr. Forrest Malakoff from the United States, has 20 years of experience providing primary healthcare in local towns in the province of Bohol. They support chronic disease management and provide access to medical and dental care through collaborative efforts with local nurses, midwives, students and volunteer physicians to improve the health of local residents. With a mission to deliver sustainable and effective healthcare programs to resource constrained communities, SIGHT offers two project opportunities for students to apply innovative ideas and tech-know-how to a distant community for impactful change.

Data management is expecting to enhance the healthcare service delivery in two key dimensions. First, data analysis for assessing demographic, needs and services performance. Second, data for accurate resource planning for future heath care interventions initiatives. Philos Health is expanding into new service location with an expected increase in team size and patient numbers. Accurate data linking the service performance and potential needs prediction is essential for them to set up strategies or new targets and track progress, ensuring programs are responsive to community needs. Their vision emphasizes partnerships with professionals and international NGOs to extend their reach while prioritizing local decision-making and active community participation.

Project 1: Data Management for Diabetes and Hypertension Patients

Philos Health offers 50 medications regular check-ups for patients with chronic illnesses (Philos Health, n.d.)

Diabetes is a major health concern in the region, largely due to dietary habits that significantly contribute to its increase in the diabetic population. An imbalanced and unhealthy diet is the primary cause causing rising diabetes among the citizens. Their daily food intake includes significant amounts of sugary drinks, fried foods, and excessive rice consumption with adults averaging 9 servings of rice per day. These sugar rich and nutrient deficient diets significantly increase the risk of developing diabetes. Most people are undiagnosed and those that are diagnosed are most often untreated.

Diabetes and hypertension are widespread, yet most individuals—estimated at 90% or more—do not receive treatment due to lack of resources. There is a lack of diagnostic resources like diabetes test strips. With a mission to monitor and control the situation, Philos Health provides free primary care and medicine. Their goals include managing these conditions to reduce complications, with objectives to expand services from one town (population 36,000) to a second (population 24,000-26,000) in June 2025. Future plans involve deploying nurses to monitor blood pressure and blood sugar across villages and

improving data collection to target the patients who are at high risks and track treatment outcomes.

Potential areas for collaboration and innovation lie in developing data management systems that not only record the number of individuals served but also capture comprehensive clinical and demographic details. Currently, Philos Health tracks the total number of patients with conditions like diabetes and hypertension; however, it does not answer critical questions, such as: How many people have diabetes? What are the ages of those diagnosed, their gender, and which village within the town do they reside in? In addition, while data on medication adherence and blood sugar levels are collected, these figures alone do not reveal whether the treatment has reduced the individual's risk of complications—such as cardiovascular disease, kidney failure, nerve damage, or vision impairment—or if the patients are indeed "better off" than they would have been without care.

Your task is to develop an innovative idea and prototype to collect and analyse health data to achieve at least one of the following objectives:

1) **Measure the effectiveness:** collect and analyse appropriate data to assess the extent of medical diagnosis, medications and/or lifestyle interventions in reducing the complications of chronic diseases. This may include tracking the patients' adherence to treatments and healthy lifestyles.
2) **Evaluate the influence of the patients' demographics** of patients on disease prevalence and treatment outcomes
3) **Identify patients at risk** of diabetes or hypertension

Project 2: Dental Health Impact Checker

Philos Health set up 2 dental clinics in elementary schools to provide free cavity treatment (Philos Health, n.d.).

The second project targets elementary school via Early childhood caries (ECC) program.

ECC is defined as one or more decayed, missing, or filled primary tooth surfaces, and it significantly impacts a child's overall health and quality of life. This condition is particularly alarming among underprivileged children in developing countries, where untreated decay can lead to broader infections, cause pain that disrupts eating and mood, and ultimately affect school performance.

The primary causes of ECC include excessive consumption of sugar and carbohydrates, a lack of fluoride in drinking water, and harmful practices such as putting babies to bed with sugary drinks—a habit that can lead to baby bottle syndrome. Globally, oral disease is the fourth most expensive ailment to treat. In Southeast Asia, where the dentist-to-population ratio varies from 1:1,700 to 1:50,000 (with remote areas facing even greater shortages), studies indicate that around 5- to 6-year-olds suffer from a median caries prevalence of 79% and an average experience score (dmft/dmfs) of 5.11 across 11 nations (Philos Health, n.d.). The DMFT score (Decayed, Missing, and Filled Teeth) is a standardized measure used in dentistry to capture an individual’s lifetime experience with dental caries (Klein, Palmer,

& Knutson, 1938). For each person, the DMFT score is the sum of Decayed, Missing, and Filled Teeth of a person in their lifetime. In the above case, each individual in Philippines has around 5 teeth (or tooth surfaces) that are either decayed, missing due to decay, or restored, indicating the serious oral health practice in the area.

Back in 2014, Philos Health's evaluation revealed that 97% of four-year-olds had cavities, averaging 6.1 per kid. Since 2015, they have been setting up Molineaux Children's Dental Clinic at elementary schools to provide services such as fillings, extraction, fluoride treatments, sealants, cleanings and they hand out toothbrushes and toothpaste while teaching kids how to brush. So far, their two clinics reach about 30% of the kids in one town, treated 2,500 students, providing 28,000 treatments valued at $3.4 million and ensuring all children are cavity-free by sixth grade. and a third clinic is on the way. With the plan on expansion of services, a systematic data management system appears to be more important for patient health progress tracking and service provision planning.

Currently, Philos Health has collected some data for the ECC program. These include the treatment data and oral health metrics for general data analysis. As for the treatment data, it collects the number of treatments provided, broken down by specific types (Exams, Cleanings, Fillings, Sealants, Fluoride, SDF, and Others). It also categorized by year and schools, barangay and grade level. As for the oral health metrics, it calculates 'Caries Prevalence' with the percentage of children affected by cavities and project 'Caries Experience' with the average number of cavities per child. However, the data are either on paper records or in formats that cannot be readily retrieved.

To improve accurate service impact and identify specific user's need and experience. Your Task is to provide innovative ideas and protypes to achieve at least one of the following objectives:

1. **Ensure children receive timely dental care:** This may include tracking each primary school student's treatments and oral health performance in order to provide follow-up and proper care.

2. **Effective Distribution of Service:** Measure and identify the patients with the most urgent need to provide appropriate treatment.

3. **Visualize the impact of dental care program:** improve the oral health metrics and collect appropriate data to help access the long-term impact on child development.

Barriers for Deployment of Health Data Technology

Photo showing a Barangay (village) Clinics for primary healthcare. [1]

Consider the local limitations in delivering a practical solution. Your proposal should therefore also discuss approaches to overcoming the barriers for deployment of technology.

Operating in Jagna, Bohol poses significant challenges for technological deployment and healthcare delivery due to its diverse and dispersed population. Many residents live in remote upland barangay mountainous areas over 40 minutes from the town center—where access to medical care is limited by the absence of regular public transportation and the long distance from specialized care in Tagbilaran, a 90-minute journey. Although Philos Health has established dental clinics and supports Rural Health Units in these areas, geographical dispersion creates logistical difficulties. Meanwhile, the internet connection in rural regions might not be stable. In some remote areas, logistical challenges such as poor road conditions could further delay technical support and repair.

[1] https://dumaguete.com/barangay-pulantubig/

Philos Health provides primary care at the barangay clinics. Only basic furniture pieces and measuring devices are available. There are computers at the local government offices that might be available to use. The volunteer medical team visits different Jagna Barangay on each day of the week with 2-4 Philos doctors, 1 local doctor, 1 local nurse (translator). Besides the staff, they occasionally partner with local students for volunteer work. In short, manpower is limited. Transferring data subsequent of the visits from paper to digital format had been attempted but was found to be un-sustainable.

There is a recognized digital literacy gap in the Philippines, particularly in rural areas such as Bohol. Local health workers may not have smartphones and their exposure to digital technology may be limited. In addition to designing data management with intuitive interface, IT education and training are necessary for the adoption and continuous utilization of health data technology. Philos Health had experienced some failed attempts on digitalization due to lack of follow-up on the technology transfer.

Make an Impact

Join our competition and leverage existing technologies to transform health impact assessments in low-resource communities. Your innovative, culturally sensitive solutions will empower Philos Health to improve program effectiveness and optimize resource allocation for project sustainability. Your work will benefit Jagna's underserved population, especially those vulnerable groups that are battling diabetes, hypertension, and dental issues. Seize the chance to make real-world changes and help build a healthier, more resilient community.

Competition Rules

The competition will consist of two-parts, virtual competition with one submission and an on-site mixed teams competition for the shortlisted teams/students. The details are as follows:

1st part of competition: assessing the proposals and prototypes that focus on ideas generation. Participants are not required to travel to join this competition. One Entry will be accepted for each team on your selected topic.

2nd part of the competition: This is only applicable to the selected teams.
After the submission, outstanding teams will be invited to join the second part of the competition. The second part of the competition includes an on-site conference with discussion sessions to regenerate and improve your ideas. The second part of the competition will be assessing the proposals and prototypes with an emphasis on technology deployment.

The deliverables will consider technology used as well as the deployment of technology. Participants are encouraged to think about how to overcome barriers for successful deployment of your solutions.

Registration & Eligibility

- **Participants**: Open to undergraduate and graduate students from Universities in the Asia Pacific Regions.
- **Team Composition**: Teams must consist of 2-5 students. The group should compose of 2-4 undergraduate students and up to 1 postgraduate mentor (optional)
- Cross-disciplinary teams are encouraged, and all participants in 1 team should be from the same university (exchange students should register from their host university).
- **Choose your topic**: There are two projects for participants to choose from. Please show your preference in the registration form.
- **Deadline**: **Teams must register by 15th September 2025 via SIGHT website and choose one of the two sub-topics to work on.**

Submission Requirements

Teams will submit 10-minute video in English, with a conversational prototype (examples of prototypes please see next session 'Prototypes'). The submission must:

- Clearly articulate the problem and propose solution.
- Demonstrate innovation, feasibility, and evidence-based impact.
- Include a plan for implementation and data collection with different stakeholders, including the local students, nurses, medical professionals, government and NGOs for project sustainability and impact analysis.
- Videos to be uploaded to an online platform for public access and share the link with us through the submission page that will be provided once the team registration is acknowledged.

Prototypes Submission Guidelines

Prototypes can be demonstrated in a 10-minute video or submitted as up to 3 supplementary documents. Choose the format that best illustrates your ideas, keeping in mind that different types can be mixed together. The format should align with your team's objectives and solutions.

Examples:

- **Educational Prototypes:** Use lesson plans, curriculum outlines, or proposals for establishing educational systems. Role-play demos (recorded on video) can concretely visualize the design, e.g. create a STEM course with lab modules and group projects for rural students.
- **Business Prototypes:** Develop a comprehensive business plan, promotional materials, stakeholder engagement strategies, and user journey maps. For example, to encourage rural women to adopt handwashing habits, propose a soap-making business combining financial self-sustainability plan with feedback from users' groups.
- **Software Design Prototypes:** Present a working module to demonstrate interactive features, supported by UX/UI mockups.
- **Physical Prototypes:** Include models such as 3D-printed designs, construction models, or functional devices.

Prizes

Submissions will be evaluated by a panel of judges based on:

- **Innovation**: Creativity and originality of the solution.
- **Feasibility**: Practicality and cultural sensitivity.
- **Impact**: Potential to address the health challenge effectively.
- **Sustainability**: The collaboration model and long-term system management.

- **Presentation**: Clarity and quality of the prototype.

Up to 15 students from the shortlisted teams will receive travel awards to collect data and further implement their project on site. The winning team will be announced within 1 month upon submission.

- **Grand Prizes**: In recognition of their on-site prototyping and project implementation, HKD 30,000 cash prize will be awarded to the top performing teams.
- **Certificates**: All participants will receive a certificate of participation upon completion of the full competition.

Timeline

- **Registration:** 15th June 2025 – 15th September 2025
- ***Information Session:** 5th September 2025 (interested students are welcome to join our information session to meet our partners and judges)
- ***Training Sessions:** 8-12th September 2025 (timeslot will be open for registration after the information sessions, please stay tune to SIGHT's competition page)
- **Submission Deadline**: 31st October 2025
- **Judging Period**: 31st October – 30th November 2025
- **On-site Training Camp**: January 2026

*Participation is voluntary

Visit our website http://sight.ust.hk or competition webpage https://competition.sight.ust.hk for detailed guidelines and updates. Please feel free to contact us through email (sight@ust.hk) if you have any enquiries.

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About US

Student Innovation for Global Health Technology (SIGHT)

Established in 2014 by Prof. Ying Chau, SIGHT is an interdisciplinary undergraduate platform at HKUST for student innovations to address global health issues under resource-limited settings. With the motto “Simple Technology Big Difference”, SIGHT aims to empower students with skills and mindsets to apply design thinking for the development and deployment of technology and education innovations.

The Hong Kong University of Science and Technology (HKUST)

The Hong Kong University of Science and Technology (HKUST) (http://hkust.edu.hk/) is a world-class university that excels in driving innovative education, research excellence and impactful knowledge transfer. With a holistic and interdisciplinary pedagogy approach, HKUST was ranked 3rd in the Times Higher Education’s Young University Rankings 2024, 19th Worldwide and No.1 Hong Kong in Times Higher Education’s Impact Rankings. The university places a high emphasis on the learning experience and quality of our students, and we strive for nothing less than excellence. Our unwavering commitment to fostering innovation and leadership empowers our students to become catalysts for meaningful change, both locally and globally.

Partner

The Design for Global Health Competition 2025 is in collaboration with Philos Health. We thank our partner for the support and expertise to advancing global health innovations together.

Sponsor

SIGHT and The Design for Global Health Competition is generously supported by Seal of Love Charitable Foundations. We thank the continuous support of the donations to help deliver student innovations to under-reserved communities.

Legal Disclaimer for University Competition

Intellectual Property & Open Source Policy

By participating in this competition, students acknowledge that all innovations, ideas, and projects developed within its scope shall remain open source. The university encourages the sharing of intellectual contributions to foster academic development and sustainability. Participants waive any exclusive ownership rights over their submissions and agree that their work may be freely accessed and screened by HKUST SIGHT and share them ono our website.

Travel Responsibility

The university and competition organizers assume no liability for participants' personal safety during on-site visits or related travel. Each participant is responsible for adhering to their respective university’s travel policies, including obtaining necessary permissions, insurance coverage, and safety precautions. The

organizers strongly advise students to consult their institutions for relevant overseas travel guidelines before engaging in any competition-related activities.