

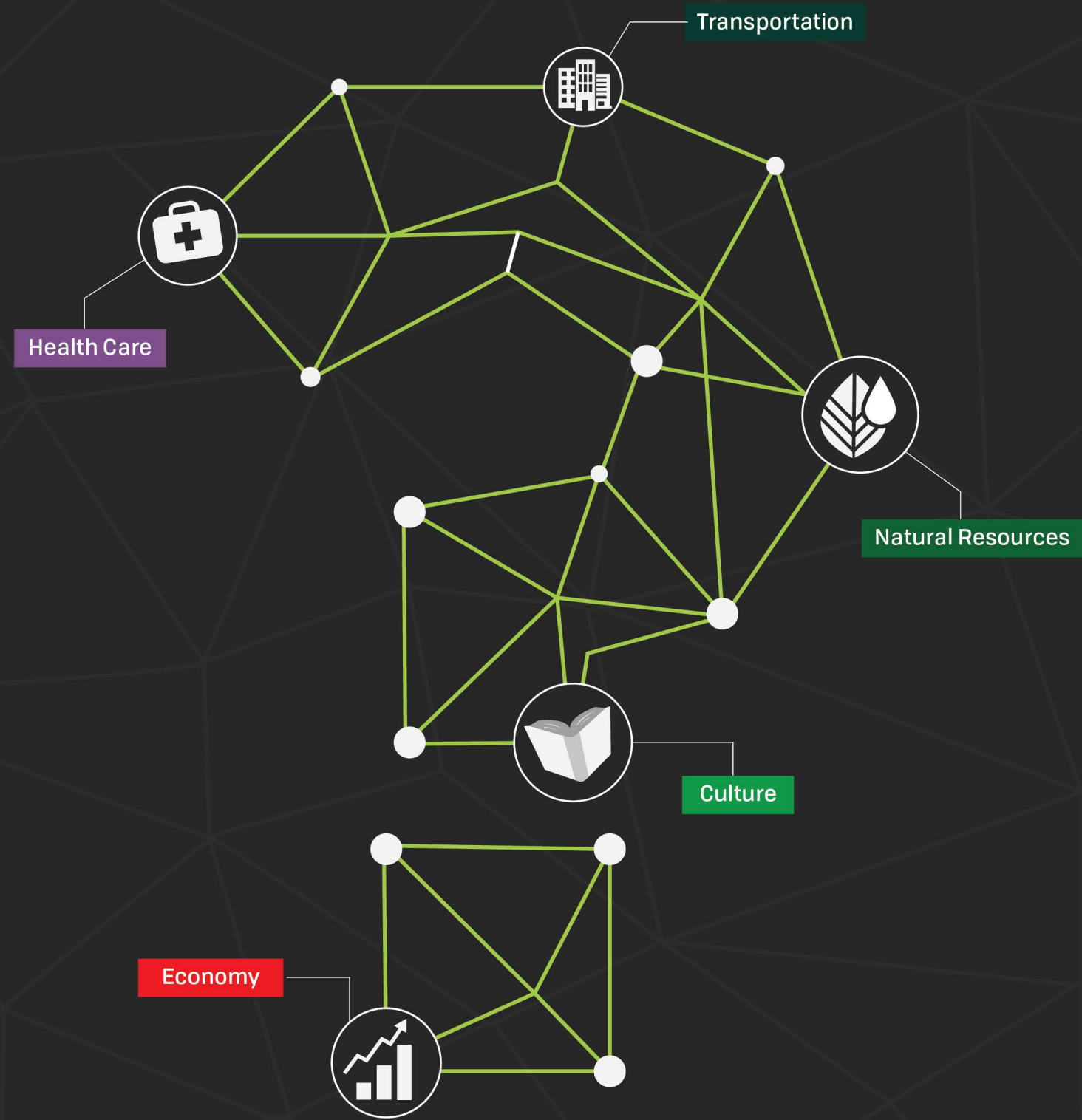


June 2017  
Issue #5

DE LA SALLE UNIVERSITY  
RESEARCH • INNOVATION • CREATIVITY

# Questions





WE ASK TO

**KNOW | ACT | CHANGE**

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# Questions

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We seek for answers-

to survive changes.  
to understand our differences.  
to empower people.  
to make big ideas come to life.

**QUESTIONS** is a publication of De La Salle University featuring research projects and creative endeavors by its faculty.

**QUESTIONS** supports De La Salle University's vision-mission to be "a leading learner-centered and research university, attuned to a sustainable Earth, bridging faith and scholarship in the service of society, especially the poor and marginalized."

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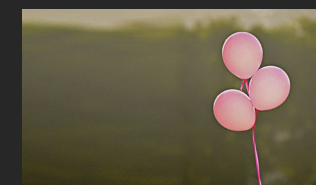
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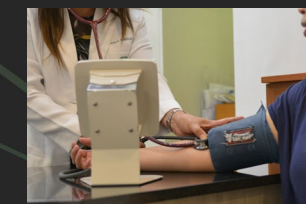
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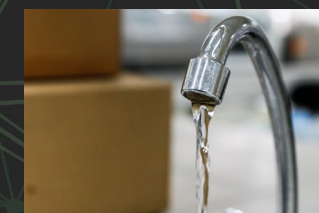
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# How are entrepreneurs made ?



A study on the Filipino youth's likelihood to either get employment or engage in entrepreneurial activity offers insights that can help in creating a framework for government's job-generation programs.





Young Filipinos explore opportunities through entrepreneurship.

Dr. Brian Gozun

In recent years, the youth made up more than half of the Philippines' jobless sector. Recognizing the need to identify constructs and create policy frameworks that will facilitate employability and encourage entrepreneurship among this segment, De La Salle University Associate Professor Dr. Brian Gozun of the Ramon V. Del Rosario College of Business and Asian Institute of Management Associate Director Dr. John Paolo Rivera embarked on a study about a young person's likelihood to acquire employment and engage in entrepreneurial activity.

Focusing on the study's definition of youth—people aged 15 to 30 years old—the researchers sought to answer these two questions about them: How can the youth become employed? How can they be entrepreneurial?

Entitled "Youth Employment and Entrepreneurship in the Philippines," the study was funded by the Angelo King Institute for Economics and Business Studies (AKIEBS) and used Community-Based Monitoring System (CBMS) Network surveys to highlight the impact of certain variables on entrepreneurship.

In their analysis of survey data, the researchers used *multinomial logistic regression*, a predictive analysis used to explain the relationship between a dependent nominal variable and a set of interval or ratio-scale independent variables. Their analyses showed how demographic characteristics and level of education can influence a youth's likelihood to either acquire employment or engage in entrepreneurial activity.

Gozun recalls that one of the project highlights was finding out insignificant difference between the mean income of people who are employed and those who are entrepreneurs. He conjectures, "the amount of income versus the risks involved in entrepreneurship is why the youth generally prefer salaried employment to the former, even if they enter into casual or contractual employment."

Advocating entrepreneurship as a means to job generation, the researchers look forward to recommending programs that are aimed at increasing the youth's entrepreneurial interest. "I hope that our study would be used in creating a framework to improve the program design and implementation of targeted support for youth employment, especially entrepreneurial undertakings," he adds.



## Employment and Entrepreneurship

**74.5 million**

Global youth unemployment in 2013 (International Labor Organization report)

**2.9 million**

Unemployed Filipinos in the country in 2014; Filipino youths account for more than half of the total (Department of Labor and Employment report)

**18.5 million**

Filipinos starting or running a new business in 2013 (*Entrepreneurship in the Philippines: 2013 Report*, DLSU Publishing House)

Dr. Brian Gozun is an associate professor of the Ramon V. del Rosario College of Business. He co-authored the study with Dr. John Paolo Rivera of the Asian Institute of Management.

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# What can we use to estimate disaster recovery?





An online software developed by a DLSU School of Economics associate professor uses a dynamic model for understanding economic vulnerabilities and developing recovery strategies in times of disasters.





Stakeholders from various sectors attend training-workshops to analyze different cases using *Disaster R.E.A.L.M.*

To help government agents, policy makers, and affected sectors in assessing the socio-economic impacts of natural disasters, a team of DLSU faculty researchers developed a free online software dubbed as Disaster-R.E.A.L.M. or Disaster Risk Estimation and Analysis using Leontief Models.

School of Economics Associate Professor Dr. Krista Yu shares that the freeware, which is based on the input-output model developed by 1973 Nobel Laureate in Economic Sciences Wassily Leontief, quantifies the economic impacts of natural disaster. The input-output model presents the economy as a system of linear equations and captures the interdependencies between economic sectors making it easier to look at the structure of the economy.



Dr. Krista Yu

The project is a spinoff of a previous version of the software which uses a static model. The static model assumes that if a disaster happens, implications are suffered in an instantaneous manner. The new version uses the dynamic formulation to capture recovery time.

Yu adds that historical evidence shows the possibility of successive disasters, which may be independent from or dependent on each other. This induces destruction of the economy and disrupts recovery measures implemented prior to the next disaster. Given this, the team saw the need to develop a dynamic inoperability input-output model for the Philippines to provide a better insight on the economic vulnerabilities of the country that would help in identifying recovery strategies.

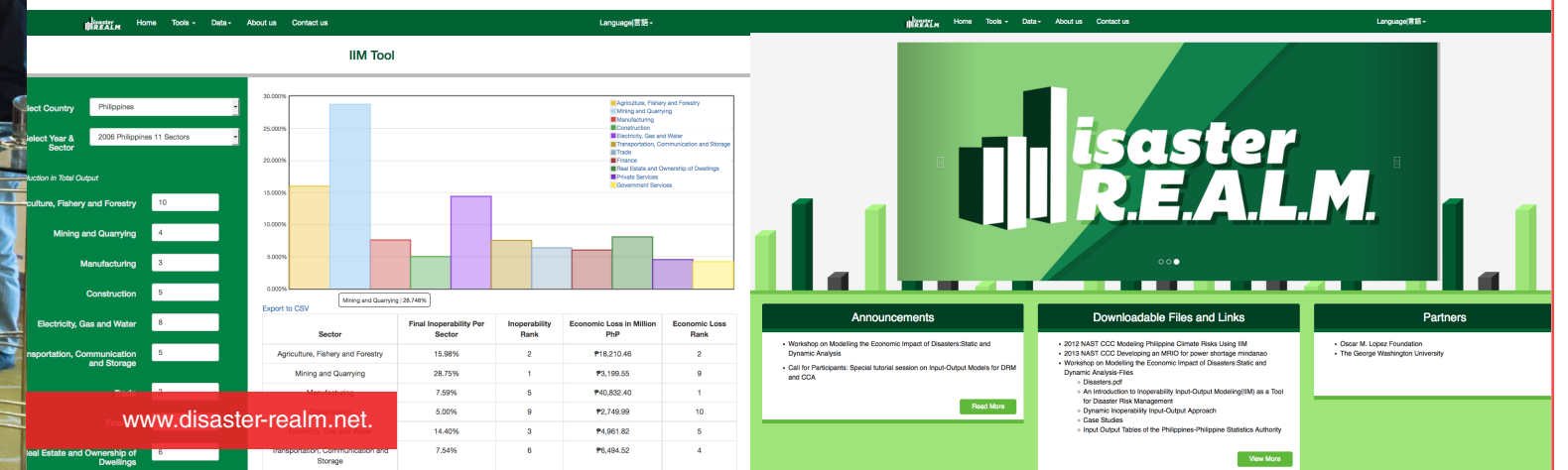
The software is available for free online and anyone with internet access who needs science-based estimates can easily quantify the economic impact of a natural disaster such as a typhoon using even a smartphone.

To disseminate information regarding the software, the team regularly holds workshops for government agencies such as Department of Agriculture, Philippine Institute of Volcanology and Seismology, Philippine Atmospheric Geophysical and Astronomical Services Administration, Department of Energy, and Department of Public Works and Highways as well as local government units, researchers, graduate students, and faculty.

During workshops, stakeholders are equipped with the foundations of the software and the theories behind it. To ensure that the participants understand how the freeware works and how it will be useful to their agencies, the training also includes a case study analysis. Attendees are taught to analyze different cases such as typhoons, droughts, or power shortages using *DISASTER R.E.A.L.M.* to produce estimates then interpret the results. With such

knowledge, they can lead their respective communities in preparing and responding more efficiently in times of crisis.

The *DISASTER R.E.A.L.M.* freeware is accessible through <http://www.disaster-realm.net>.



## Land at risk

**20**

Average number of tropical cyclones in the Philippines every year

**2013**

The year Typhoon Yolanda, the deadliest Philippine typhoon on record, hit the country. There were 25 tropical cyclones during this year.

**22**

Out of an estimated 330 volcanoes in the country, the number of active ones

**5**

Average number of earthquakes experienced daily in the country

(<http://ndrrmc.gov.ph/>)

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# Why integrate indigenous culture into higher education?



Professors from DLSU's Behavioral Sciences, Philosophy, and Psychology Departments and the DLSU Social Development Research Center (SDRC) are working together to integrate Filipino indigenous cultures into the curriculum of higher education institutions.



Out of sight, out of mind. This is the prevalent idea on indigenous people (IP) and cultures in the country. Many teachers and students have very limited knowledge of these ethnic groups and their cultures. IP culture isn't something they'd normally encounter; it does not seamlessly blend into their daily routines. "Why would we even integrate IP culture and knowledge into the curriculum when they're so far away from us?" some would ask.

Filipino IP groups are found all over the archipelago. From the coasts to the highlands, there are over a hundred groups that help make up the country's ancestry. Yet, these groups and their cultures are met with a startling unfamiliarity.

For this reason, DLSU College of Liberal Arts faculty members Dr. Hazel Biana, Dr. Melvin Jabar, and Dr. Homer Yabut, with a grant from the United Board of Christian Higher Education in Asia (United Board), spearheaded the project "Reclaiming Filipino Indigenous Cultures through Teaching and Learning." The project was also done in accordance with Dep Ed. Order #51 S. 2014, which seeks to promote among teaching and non-teaching staff of learning institutions cultural sensitivity, respect for cultural diversity, and a deeper understanding of cultural expressions of IPs.

"We came up with this project because right now, Philippine HEIs or higher education institutions are transitioning to the K-12 system. This means most of the courses will be revised and redeveloped for the needs of

the universities. So, we thought, perhaps we should find a way to integrate indigenous knowledge and cultures into the curriculum," Biana shares. "One of the things we uncovered in the initial stage through our focus group discussion is that teachers are not actually integrating IP culture in their curricula. The reason for this is they are usually in the center—so when you say they're in the center, they're in urban schools."

Much of the country's cultural identity is gleaned from the center and this is considered as the norm. This prompted the team to work on a study that would potentially bring the margins to the center and help integrate the minority into the majority.

FGDs, mounting a conference for educators and experts in IP cultures, and developing a monograph meant for distribution to schools all over the country, make up the core phases of the project. The initial FGDs were held in Cagayan de Oro, Pampanga, and Manila. Other areas near IP communities were also tapped. In the project's initial phase, the researchers assessed the needs of teachers, studied how to integrate IP culture into the curriculum and train teachers, and streamlined the possible topics to include in the monograph.

A forum was then held in De La Salle University. "[Aside from experts on IP culture], we also invited directors of indie films that focused on the IP community. The teachers who participated were very much appreciative and they told us that whatever they learned from the forum, they will bring back to their respective institutions," says Biana.



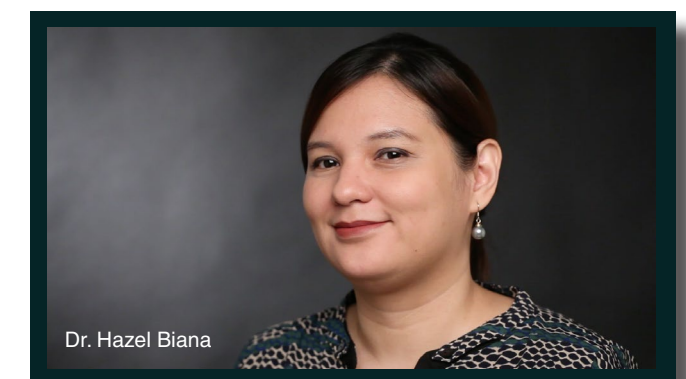
DLSU faculty members interact with local communities for the integration of indigenous cultures into the college curriculum.

The modules included in the monograph use a transformative outcomes-based pedagogical framework. Guide questions on students' prior knowledge, learning activities, and suggested readings are some of the features of the book. Covered topics include the peopling of the Philippines; Philippine IP groups and their identity; IP philosophy, worldviews, and spirituality; languages and literatures; arts and crafts; and customary laws, livelihood, and technology, and psychology.

Copies of the monograph are currently being distributed to various schools all over the country. The team is also working on an online version of the manual, which will be made available as a resource for more schools.

While "Reclaiming Filipino Indigenous Cultures through Teaching and Learning" has yet to bear more fruit, Biana and the team see how the project can be helpful. "One of the feedback that we got is that students only hear about

IPs if there is an issue or political dilemma. If IP culture is integrated into the curriculum, then it's not something they just hear from the news—it is something they are aware of, it is something they are actually looking forward to working on, and it is also something that can help enrich their knowledge."



Dr. Hazel Biana

The project proponents, Dr. Hazel Biana, Dr. Melvin Jabar, and Dr. Homer Yabut, are associate professors of DLSU's Philosophy Department, Behavioral Sciences Department, and Psychology Department, respectively.

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# What can we do for an endangered language?



Writer and DLSU faculty member Dr. Genevieve Asenjo creates a website for distant writers and speakers of Kinaray-a to be connected with each other and help preserve their language and culture.





Through the exploration of new social platforms, a Lasallian research fellow from the Department of Literature, Dr. Genevieve Asenjo, attempts to document, preserve, and capture the evolution of Kinaray-a, one of the major Philippine languages spoken primarily in the province of Antique in Western Visayas.

As Asenjo recounts, the beginnings of her article entitled, “Kinaray’a Literature Online, Isang Love Story: Inang Wika Bilang Instagram ng Alaala at Huling Museo” started during her fellowship residency in South Korea in 2009. There, she had the opportunity to interact with writers hailing from different parts of the world. What amazed her was that, despite having the capability to speak in English, these writers chose to express themselves and their works in their mother tongues. She noted that this attitude of foreign writers to use their native language ran against the general practice of institutions in the Philippines

which specifically chose to send Filipino writers in English. This phenomenon is not surprising given our long history of colonization, she adds.

Asenjo also attributes the period after the first EDSA Revolution as another context that opened access to writers outside of Manila. In 1991, the Cultural Center of the Philippines (CCP) and the National Commission for Culture and the Arts (NCCA) started to give writing grants to writers across the country. As she explains it, this opened the door for many writers in the provinces and was signaling a shift away from the Manila-centrism of literary production.

From those instances, Asenjo resolved to launch the website “Balay Sugidanun” or “The House of Storytelling” which features her works and other writings, specifically in Kinaray-a and Hiligaynon.



Over a period of five years, and 532,656 visits to her site (as of May 20, 2017), she and guest writers from various parts of the world would blog, share, and produce new writings in Kinaray-a. Their group is what she calls “Kinaray-a speakers in diaspora.” With Balay Sugidanun, she makes her first attempt to map and connect her writings to big data, digital humanities, and distant reading. The website features a list of frequently used words and common themes that can be used for applied literary and cultural analysis.

She says that at its core, Balay Sugidanun operates on two ideas. On one level, it is a love story for the language itself and the writers contributing their time and talents are both “a passion and advocacy.” On another, more poignant level, it is a repository, or a museum housing what may be the final flicker for a language that may be in danger of disappearing. This comes to a particular head, as one of her site’s contributors, who has been living in America for a number of years, has difficulty writing in Kinaray-a. “You can sense her grappling with the words and there is a notable difference with her grammar, syntax, and sentence construction which are actually also elements in the study and analysis itself,” she notes.

Asenjo sees her and other similar efforts of preserving and strengthening local languages as in keeping with the state of affairs of the times—not just in the literal sense in terms of infrastructure and the development of a body of laws, but through language and literature. As she puts it, writers are “writing the nation.”



Dr. Genevieve Asenjo

Dr. Genevieve Asenjo is an associate professor of the Literature Department and an award-winning writer.

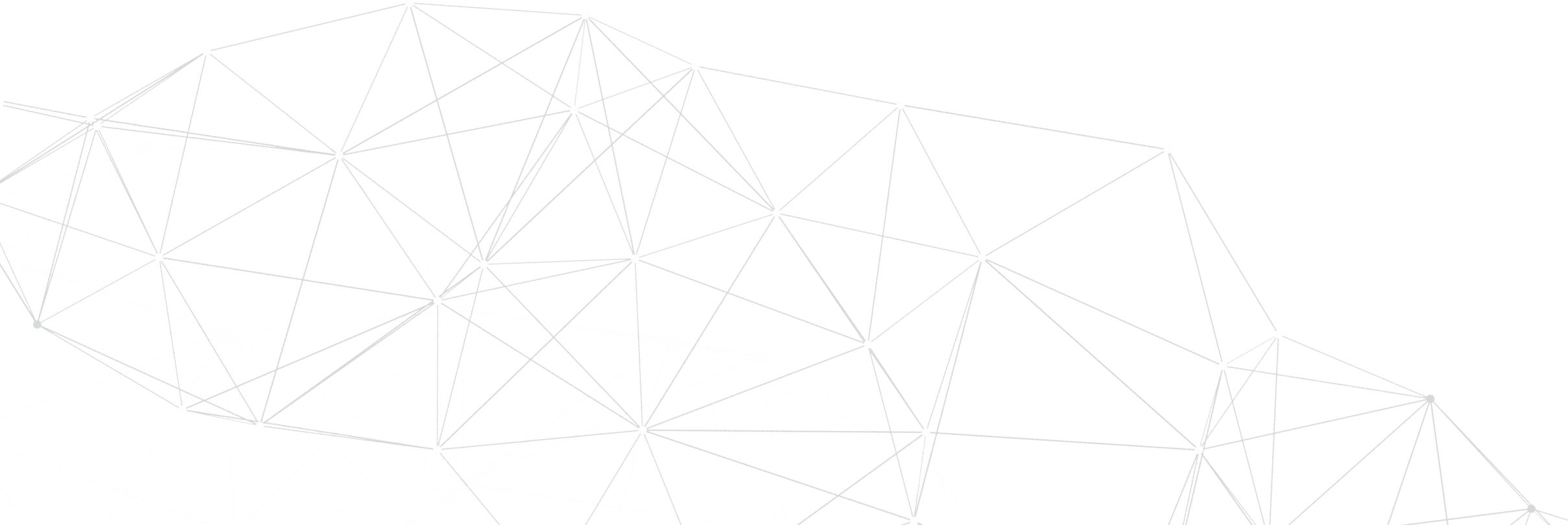
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# What does math tell us about TB?

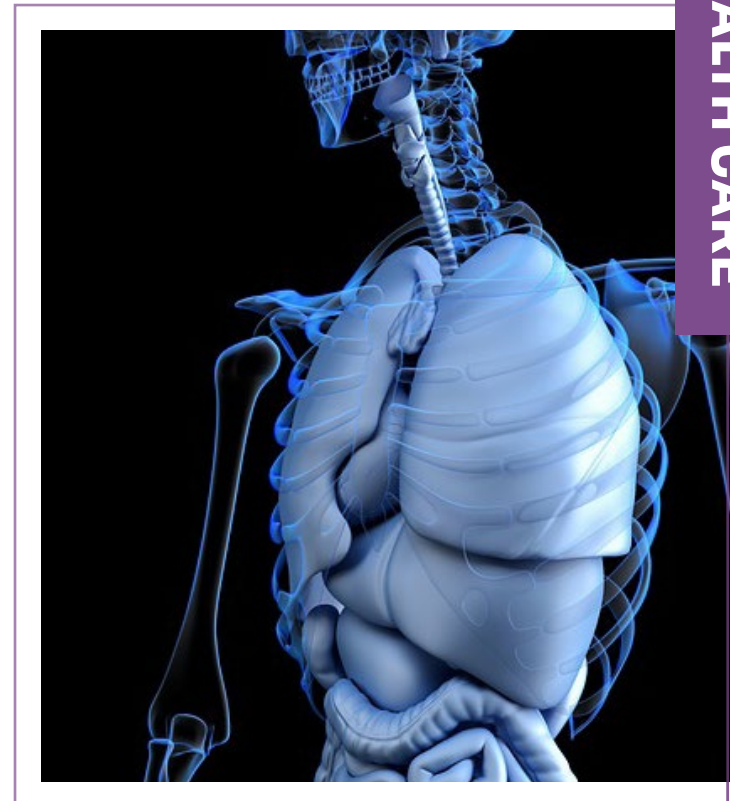


With the results of a dynamical analysis using mathematical modeling, the government can create new programs and develop more aggressive strategies to eliminate TB in the Philippines.





Dr. Angelyn Lao



The study also projected simulations that show how improving partial immunity, treatment success, treatment duration, and case detection can greatly reduce TB prevalence and incidence rates in the Philippines. However, the group found out that even if the government improves vaccine coverage among Filipinos, it would not have a significant effect on TB rates.

By understanding the results of the mathematical model, Lao says the government can create new programs and develop more aggressive strategies to eliminate TB in the Philippines. And follow-up research from her students, who are doing a study on tuberculosis on the molecular level, can also provide relevant information on how to combat the disease.

## TB cases in the Philippines

### No. 13

Among countries with highest rate of TB-related death

### No. 8

Among countries with highest TB incidence\*

### No. 7

Among countries with highest TB prevalence\*

## 4,000 (or 4 per 100,000)

Estimated number of Filipinos who have drug-resistant TB

*\*Incidence is the rate of new cases; prevalence is the total number of cases*

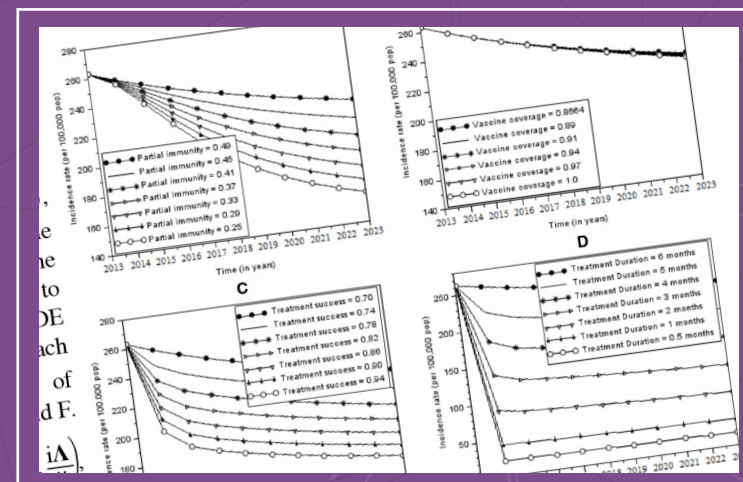
*(WHO Report 2014, cited in "A dynamical analysis of tuberculosis in the Philippines")*

Studying the incidence and prevalence of tuberculosis or TB in the Philippines is no easy feat, says Mathematics Department Associate Professor Dr. Angelyn Lao, because doctors do not regularly report the incidence of the disease among patients. But current estimates show that 80% of Filipinos are already carriers of the infection, only it is dormant and that it may be triggered if the immune system of the carrier weakens.

"We live in an environment where there is a big population of people with active tuberculosis," Lao explains. "So the best way to not trigger the activation of TB is to live a healthy lifestyle."

Lao, together with two faculty members from the University of Asia and the Pacific, King James Villasin and Eva Rodriguez, recently conducted a dynamical analysis of tuberculosis in the Philippines. They used mathematical modeling to determine factors that can significantly reduce TB in the country. The group obtained the incidence and prevalence rates of TB in the Philippines from the World Health Organization (WHO) from 2003-2013, and used this data in their adaptation of the TB transmission model developed by Dr. James Trauer of the University of Melbourne and his group.

Results of Lao's mathematical modeling are consistent with the realities currently faced by Filipinos—that despite following guidelines and achieving targets set by the WHO, the Philippines remains to be a TB high-burden country. In fact, tuberculosis is the fourth leading cause of death among Filipinos, the eighth in the world with the highest incidence, and the seventh in TB prevalence.



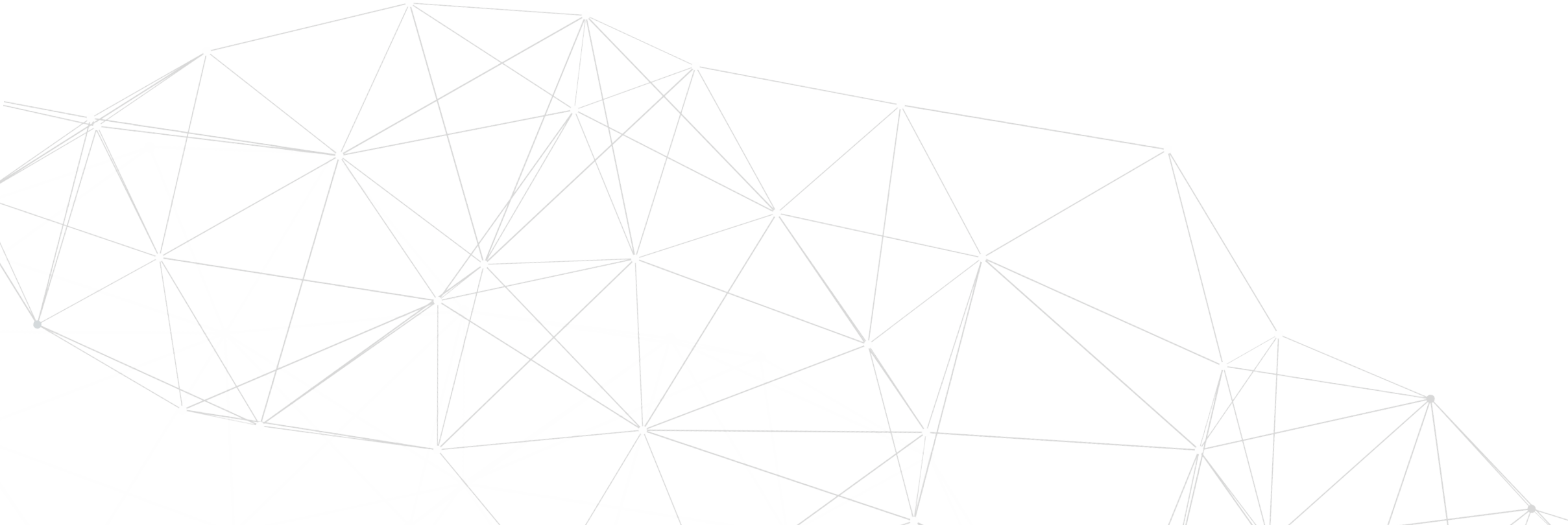
Dr. Angelyn Lao is an associate professor of the DLSU Mathematics Department. She co-authored the study with two faculty members from University of Asia and the Pacific.

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# Are you at risk of breast cancer?



A multi-disciplinary team from DLSU goes to Bacolod to study a report of high incidence of breast cancer, generating data that can be used for drawing up screening, treatment, and management programs that will address the problem.



According to the Philippine Society of Medical Oncology, the Philippines has the highest incidence of breast cancer in Asia. Most alarming is that one in every 13 Filipinas will develop the sickness in her lifetime.

This prevalence is seen in many parts of the country, including Bacolod City, where a team led by College of Science Dean Dr. Jose Santos Carandang VI conducted their research on "Addressing the high breast cancer incidence in Bacolod City."

While serving as director of the La Salle Food Institute in 2015, Dr. Carandang was contacted by colleagues from the University of St. La Salle who requested for his assistance, following a preliminary study of breast cancer in their area. They initially suspected that the affected women's health might have been threatened by the heavy metal contamination of their drinking water.

Responding to the request, Dr. Carandang formed a multi-disciplinary research team composed of Dr. Dennis Erasga of the Behavioral Sciences Department who handled the sociological aspect; Dr. Eric Punzalan of the Chemistry Department who focused on the environmental aspect; and Biology Department's Dr. Ma. Luisa Enriquez who looked into epigenetics. Dr. Elmer Jose Dadios, of the Manufacturing Engineering and Management Department, was tapped for the innovation component of the study while Biology Department

faculty Dr. Michael Ples and Political Science Department's Julien Carandang headed the policy formulation group.

Also part of the team were Dr. Balintawak Sison-Gareza and Dr. Romeo Teruel of USLS and Dr. Francis Ferraris of the Corazon Locsin Montelibano Memorial Regional Hospital, who worked on the epidemiological aspect.

With funding from the Commission on Higher Education-Philippine Higher Education Research Network (CHED-PHERNet), Dr. Carandang and his team conducted the yearlong research on the causes of breast cancer among 70 female patients in the southern city.

An interesting result of the research shows that current or previous smokers are more inclined to getting breast cancer by 1.69 times more than those who are not smokers. Having a family history of cancer also raises the risk of getting breast cancer by 4.32 times.

The study also indicates differences between those who experienced breastfeeding at different lengths of time. "When one-year duration of breastfeeding is the reference point, the study notes that there are higher odds of getting breast cancer for those who breastfed within a shorter period," shares Dr. Carandang.

The study also notes that when 26 years old is the reference age when first intercourse is experienced, there is a significant increase of odds of getting breast cancer as the age of first sexual intercourse experience increases.

From the sociological dimension, the researchers found a correlation between stress and the vulnerability and presence of patients and their families to incidences of the sickness. They have noted that stress is a common contributing factor regardless of educational background or socio-economic status of the patient. "It does not matter if she is just a plain housewife or if she is employed because the patient gets stressed either way."

Dr. Carandang adds that the women utilized a combination of attitudes and behaviors to directly and indirectly manage the strains at home and work revolving around family, religion, and their anticipated future.

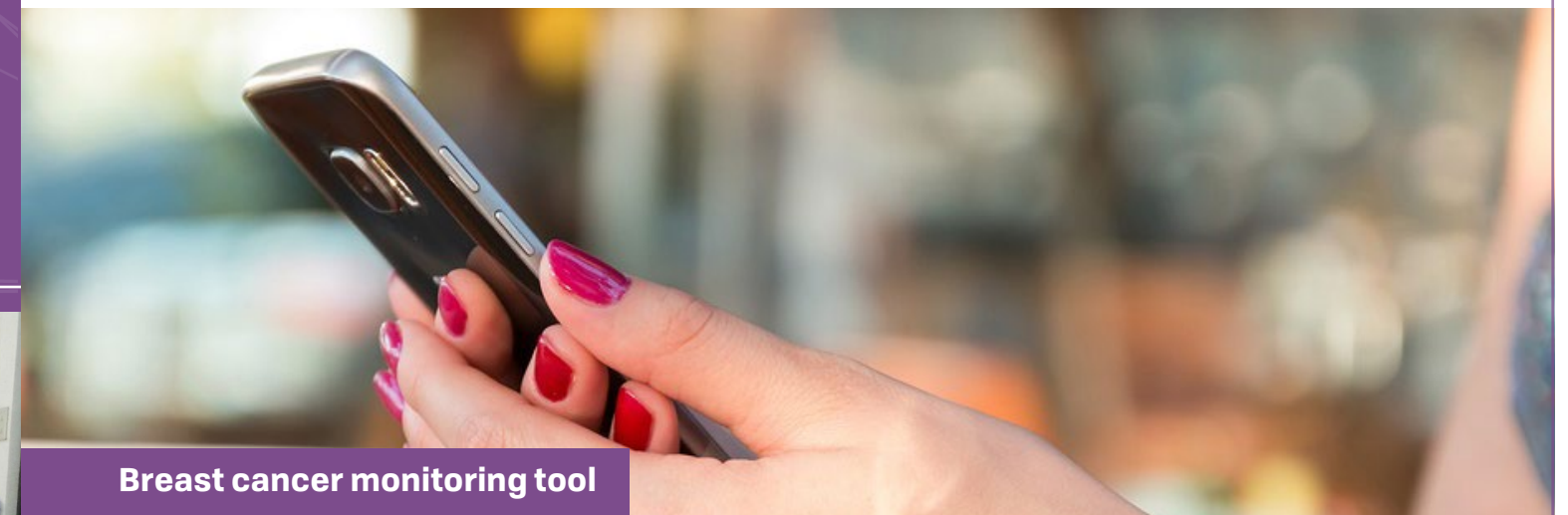
"They were not seen as mutually exclusive attempts to feel healthy; they were embraced as mutually defining." The researchers also noted the advantages of patients' participation in breast cancer support groups. "They present a positive mechanism within the community

that not only creates social awareness but also fosters genuine social support networks among members and their families," he says. Low-income members may also obtain referrals, medicines, and other forms of support from the group.

The team hopes that government agencies and civic organizations will use the data gathered by the study in drawing up screening, treatment, and management programs in addressing breast cancer in the country.



Dr. Jose Santos Carandang VI



### Breast cancer monitoring tool

To further raise awareness of breast cancer and to connect with more Filipinos, the innovation team led by MEM Professor Dr. Elmer Jose Dadios developed "Dibdib\*\* Advocacy App," a smartphone-based android application. It offers a viable option in mobile health or (mHealth) development. The World Health Organization defines mHealth as "the practice of medical and public health through the usage of mobile devices."

Dr. Jose Santos Carandang VI, COS dean and a full professor of the Biology Department, led the multi-disciplinary team that studied the high breast cancer incidence in Bacolod City.

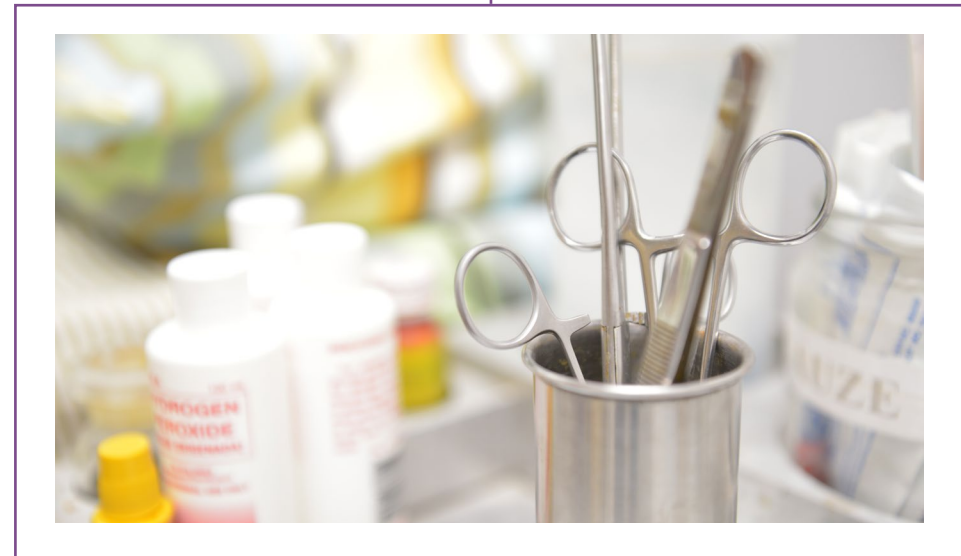
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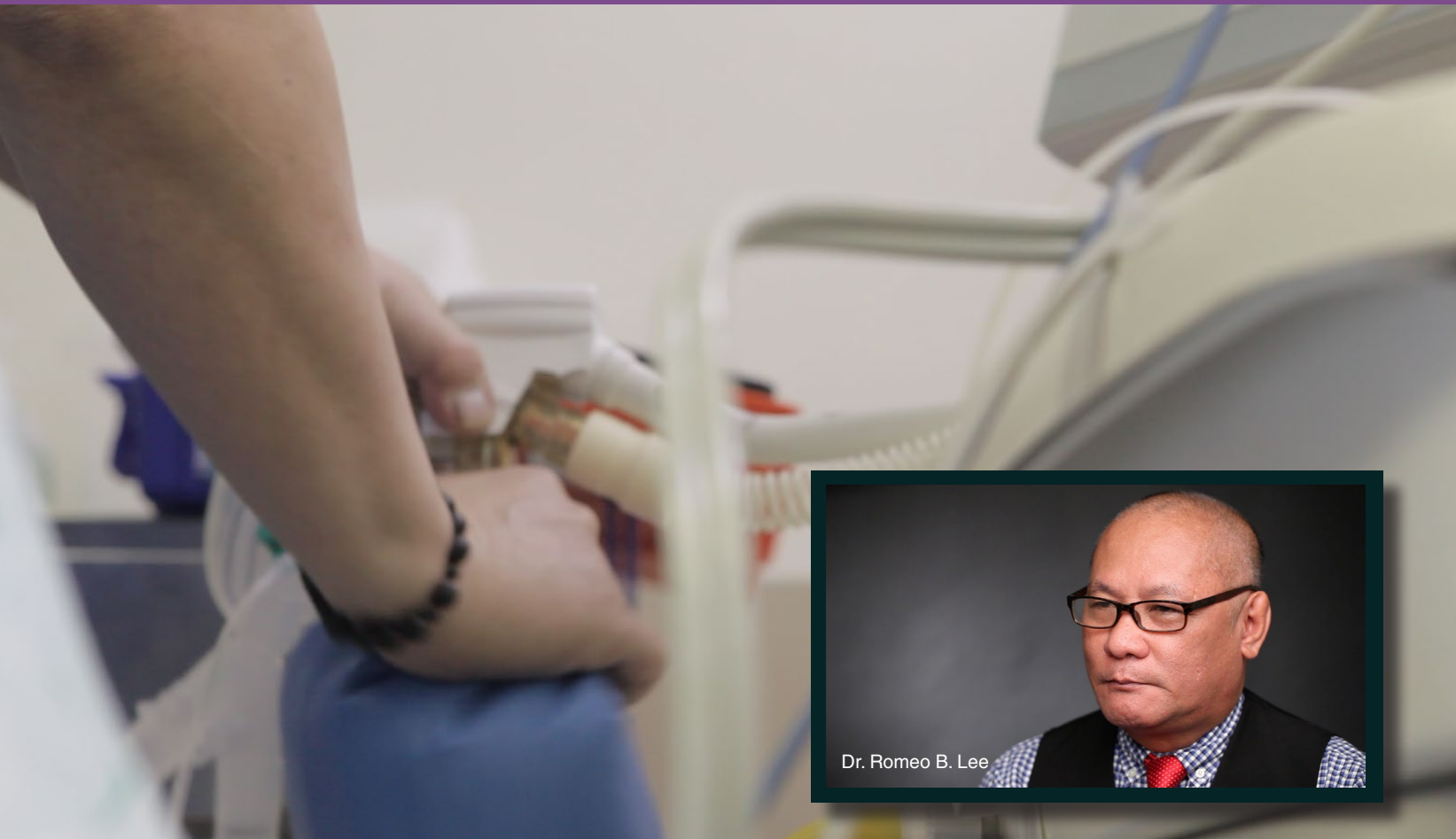
# Is our Universal Health Care enough?



Through Universal Health Care, the government intends to ensure that all Filipinos, especially disadvantaged groups, have equitable access to affordable health care.







Dr. Romeo B. Lee

A recent study led by De La Salle University Behavioral Sciences Full Professor Dr. Romeo B. Lee looks into the impact of the Universal Health Care (UHC) for all Filipinos program, or Kalusugan Pangkalahatan, on the health service delivery system in the Philippines. His team wanted to find out if the local government units (LGUs) are providing quality health care services and financing to all Filipinos.

Launched in 2010, the UHC aims to reduce the continuing inequities in health outcomes and address the challenges brought about by the implementation of the Local Government Code (LGC) of 1991. Under the LGC, the responsibility of providing health care provision is decentralized to LGUs while

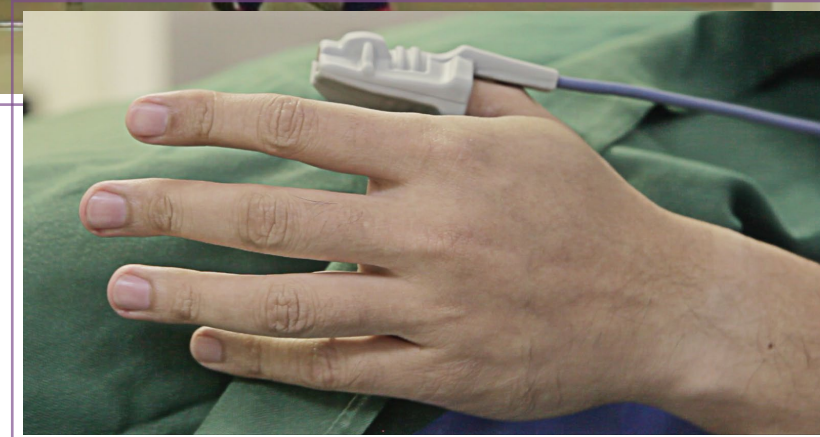
the Department of Health is responsible for the development of health policies, regulations, and standards. Lee notes that the increase in local health expenditure responsibility has yet to match the local fiscal capacity.

Through UHC, the government intends to ensure that all Filipinos, especially disadvantaged groups, have equitable access to affordable health care. According to the study, the challenge is that majority of those who seek healthcare services and financial protection from PhilHealth (Philippine Health Insurance Corporation) is from the middle class. The disadvantaged sector seldom avails of health care services.

The research also suggests that the UHC has made some impact on the delivery of quality health care services in the LGUs. Additional funding has already been provided to LGUs and improvements of several health facilities have been implemented. There is also a widening of the population accessing health care services and an increase in the number of medical professionals being provided to LGUs.

Lee adds that the impact of the UHC is only on certain provinces, cities, and municipalities. There are still LGUs that need to work on improving their health care delivery system, most of which belong to the low-performing LGUs. He points out that UHC resources and efforts need to be focused on these low-performing LGUs.

With the findings of the research project, the team intends to provide evidence and recommendations that would benefit the national government, specifically the Department of Health, as well as the local government units. Ultimately, the research seeks to aid them in developing programs or policies that will help improve the health care system in the country, and make it accessible to all.



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# How accessible is clean water?



De La Salle University receives an invention patent from the Intellectual Property Office of the Philippines for a biodegradable water filter using coconut-derived activated carbon and citricidal.



Nagcarlan—a second-class municipality of Laguna with 52 barangays straddling at the foot of Mt. Banahaw—boasts of rivers and springs, waterfalls, and lakes. Rich indeed in water resources, it would seem unlikely that the health of its people might be threatened due to the quality of their abundant drinking supply. In a survey conducted by a group of researchers from De La Salle University, it was revealed that many of the local residents from four barangays had actually suffered from many gastro-related problems because of contaminants in their water sources.

Leading the team that conducted the study was Dr. Susan Gallardo, now retired professor from the Chemical Engineering Department but who remains an active member of the DLSU Society of Fellows. Her research team further discovered that the surveyed areas' sources of water were contaminated with E.coli bacteria, which commonly cause intestinal infection, as well as with trace arsenic.

With an advocacy to provide potable water for poor communities in the country, Gallardo collaborated with a Balik Scientist, Dr. James Patrick Abulencia, faculty member of Manhattan College, New York, and Francis Narvin Tanala, a DLSU BS-MS student, to work on the development of a water purification system that would be easy to replicate, produced from materials easily accessible to the community, inexpensive, and environment-friendly. Five other students (one from

DLSU and four from Manhattan College) also participated in conducting the research.

The team embarked on a 2 ½-year project titled, “Biodegradable Water Filter Using Coconut-Derived Activated Carbon and Citricidal”, with the US Environmental Protection Agency providing funding assistance under the People, Planet, and Prosperity (P3) Program. The product of this work was a water purification system comprised of two stages. The first stage of the filtering process uses coconut-derived activated carbon to remove heavy metals. (During the course of their research, they gathered about 60 kilos of coconut shells which they brought to DOST’s Industrial Development and Technology Institute reactor to be carbonized and activated.) The second stage involves the use of citricidal, a grapefruit seed extract, to remove bacteria.

After the survey of the quality of the water supply in Nagcarlan, the presentation of the project proposal to the local residents, and the distribution of the biodegradable water purifiers to 100 families, the research team waited for six months before assessing the efficacy of the project.

“With the help of the Department of Health of Nagcarlan, we saw a drastic decline in the number of water-borne diseases. We also found out from the families who used it that they no longer had stomach trouble due to the quality of their water,” she notes.



Dr. James Patrick Abulencia (left) and the team teach local communities how to use the biodegradable filter.

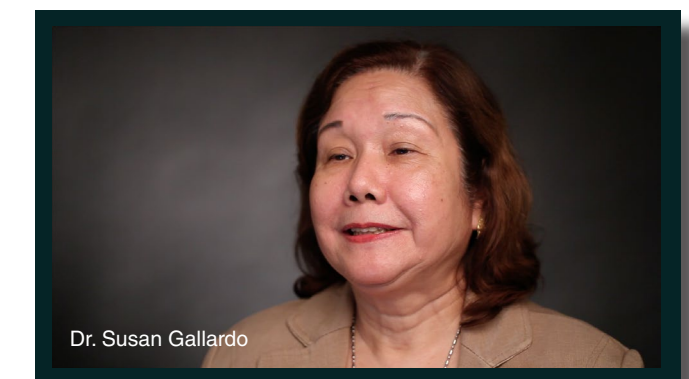
## Patent and production

Gallardo sees the various potentials of their biodegradable water filter in terms of helping poor communities who cannot afford to buy their own purifiers or filtered water, as well as for making it part of government’s disaster response and management kit during typhoons and other calamities. At the same time, it also offers an opportunity for small, local entrepreneurs to support farmers (who can provide the coconut shells) and clay pot manufacturers (who can design and provide an effective casing).

In 2016, her team received the news that the project was granted an invention patent from the Intellectual Property Office of the Philippines, and became the first invention patent for De La Salle University.

Looking ahead, she and her team have started going around rural towns in Rizal and in Mulanay, Quezon to replicate the water system. Despite the many challenges in pursuing

the project, they continue to forge ahead to make it known to more people that this biodegradable water filtering system can be easily produced locally and offers a genuine support to community development, a big idea waiting to be tapped by service-oriented leaders with the will to change.



Dr. Susan Gallardo

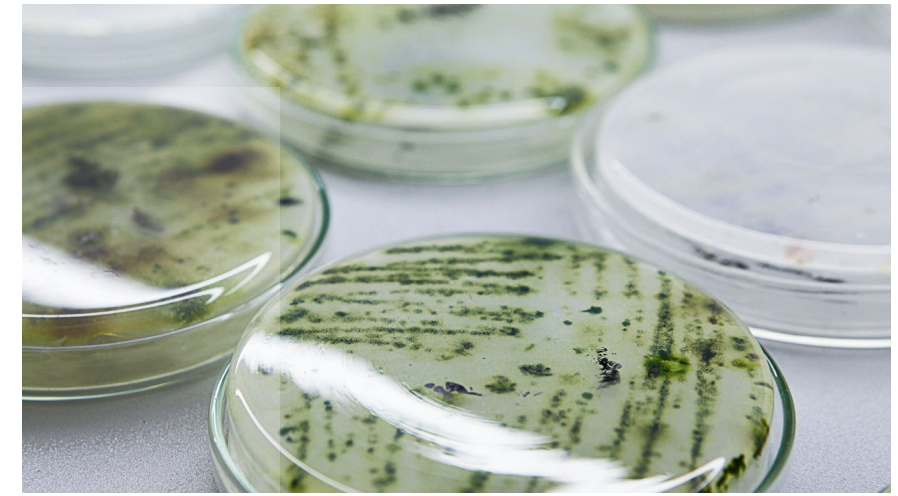
Dr. Susan Gallardo is an active member of the DLSU Society of Fellows. She collaborated with a Balik Scientist, Dr. James Patrick Abulencia of Manhattan College in New York, and Francis Narvin Tanala, a DLSU BS-MS student, for the biodegradable water filter project.

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# What's in store for the algae farming sector?

Engineering faculty members of De La Salle University established the Algae BioInnovation Global Hub, or Algae BIG Hub, a pioneering initiative to centralize research and help the local players of the algae industry to be globally competitive.





The algae industry, one of the country's leading exporters, can explore technological advances through the Algae BIG Hub.

Dr. Aristotle Ubando

In pursuit of alternative sources of energy and sustainable innovations, DLSU Engineering faculty and students have been conducting research projects involving microalgae (locally known as "lumot"), which are microorganisms that grow on carbon dioxide and sunlight. Different from the macroalgae, which are commonly known as seaweeds, microalgae are available from natural sources, typically found in freshwater and marine systems living in both the water column and sediment.

Dr. Aristotle Ubando, associate professor of the Mechanical Engineering Department, explains that microalgae can also be cultivated through photobioreactor and cultivation ponds. For the DLSU research team in which he is a part of, the interest in microalgae lies in the ability of these organisms to produce lipids that can be converted to energy such as biofuels, or to proteins and carbohydrates for food supplements.

"We have a perfect avenue for our local farmers to grow microalgae. We have a lot of species as candidates for biofuels production," he notes. With support from the USAID Science, Technology, Research and Innovation for Development (STRIDE) Program, Ubando is currently leading the project, "Process streamlining of algae production in the Philippines."

From a survey of some of the key players in the algae industry, his team discovered that the sector has a strong global demand

and has become one of the world's leading exporters of seaweeds. A government report shows that seaweed production reached 349 metric tons in 2016 alone. Most of the local farmers and traders are in the Visayas and Mindanao provinces.

Ubando says that among the problems often encountered by the sector occur during the algae cultivation and drying stages. "Our plan is to be able to come up with innovative technologies to help our farmers. We are helping in terms of developing methodologies, techniques, and technologies, such as the solar dryers," he shares.

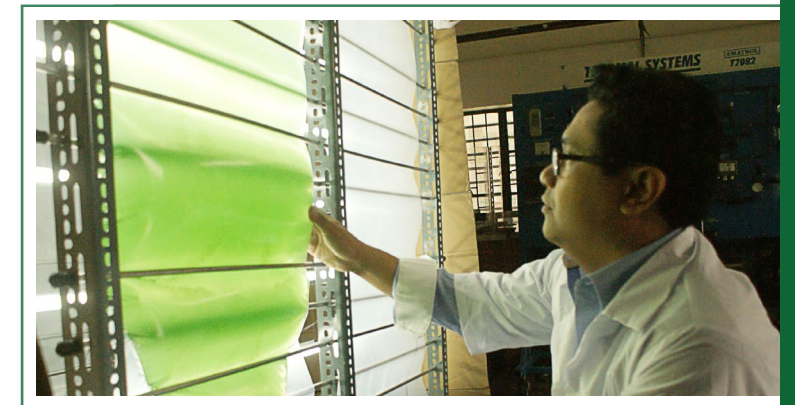
With their research, he and his fellow faculty members learned the process of algae production, from culturing and harvesting to drying. Their first prototype was created in 2011, after which they continued to enhance their design to cut the drying time to at least a day from an average of three days.

"We (in the Mechanical Engineering) partnered with the Physics Department headed by Dr. Nelson Arboleda, Jr. to look at the cellular level and the molecular dynamics, which led to an understanding of the drying technology. We have also collaborated with Dr. Emelina Mandia of the Biology Department for the growth and composition analysis of algae and Dr. Marlon Era of the Behavioral Sciences Department for the social science aspect of the algae production," he adds.

## A global hub for algae research

Ubando points out that the growing research collaboration in the field has also prompted DLSU's Dr. Alvin Culaba, Mechanical Engineering full professor and NAST Academician, and University of Arizona's Dr. Joel Cuello, a globally recognized expert in the engineering of sustainable biological and agricultural innovations, to develop the Algae BioInnovation Global Hub. Simply referred to as the Algae BIG Hub, it is a conglomeration of the stakeholders of the algae industry, which include universities focusing on algae research, government organizations, and industry players. The idea of the hub is to come up with a centralized research and serve as a venue for global experts and company representatives to solve actual industry problems.

"We are pioneering the Algae BIG Hub here at De La Salle University," he says. With the global hub, they hope to boost the industry and ultimately, the country's economy, as they further explore innovations that seek to make the local players globally competitive. For further activities of the Algae BIG Hub, one can visit their website at [algaebighub.org](http://algaebighub.org).



### Preferred microalgae cultivation sites for the Philippines' group of islands

**Luzon: Region IV-A**

**Visayas: Region VII**

**Mindanao: Region XII**

*(Application of Spatial Analytic Hierarchy Process in the Selection of Algal Cultivation Site for Biofuel Production: A Case Study in the Philippines, 2015)*

Dr. Aristotle Ubando is an associate professor of Mechanical Engineering Department. He is working with NAST Academician and University Fellow Dr. Alvin Culaba on the Algae BIG Hub Project.

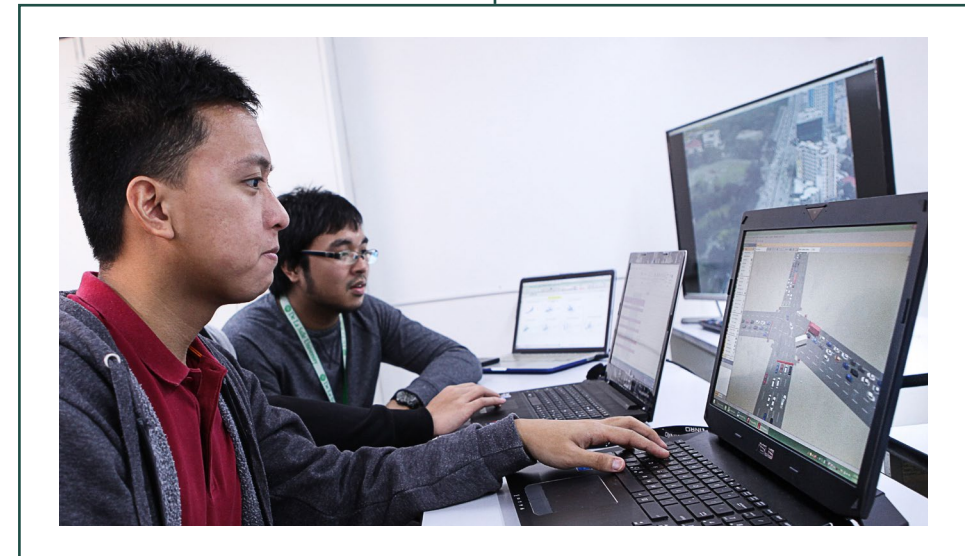
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# How can we solve Metro Manila traffic?





A research looks into the economic, social, and environmental impacts of the traffic problem in Metro Manila, for the development of a more efficient transport infrastructure and mass transit system for the whole country.



One of the biggest challenges for the Philippine government is the ever-mounting traffic woe experienced by hundreds of thousands of commuters and motorists plying Metro Manila roads every day. Studying how to meet the people's basic need to travel in and around the country's busiest cities, a De La Salle University Civil Engineering faculty member seeks for a solution that goes beyond the economic and social dimensions of the problem.

In his field of study on transportation, Dr. Alexis Fillone has reason to believe that adding an environmental perspective in tackling the problem provides a more holistic, efficient, and sustainable response. With support from the University Research Coordination Office and the Institute for Global Environmental Strategies in Japan, he embarked on a research that would evaluate proposed transport infrastructure and mass transit projects in Metro Manila.

His research delves into all planned transport infrastructure projects (both roads and mass transit systems) by the national government with funding commitment as well as unsolicited

transport project proposals from the private sector. With year 2014 as baseline, the transport modeling of future scenarios was done for years 2020 and 2030.

Fillone employs the Japan model of co-benefit cost analysis in his study, which takes into account the impacts of climate change. One way to do this, for instance, would be to understand the impacts of smoke emissions in the city. "If we are to improve local air pollution, we should be wary about harmful air pollutants which include, carbon dioxide, nitrogen oxide, particulate matter, and carbon monoxide," he says. The research thus looks not only into the usual economic and social costs and implications but also how infrastructure and transportation projects are also connected to environmental issues.

Of the proposed road infrastructure projects, he points out, "Building more roads won't solve the traffic problem. It will not affect urban travel. This is because more roads will induce more travels by car." He notes that road congestion will continue despite the construction of more roads. In his analysis, there will be an estimated 10-20% initial reduction of car users if the proposed connection of mass transit systems as well as the establishment of the Bus Rapid transit lines would push through.

Infrastructure and transportation projects are also connected to environmental issues.



Dr. Alexis Fillone

The key is really to construct more mass transit projects and encourage car users to shift, he says. "If car users do not shift, we will still have the problem of more cars on the road. If we build more, reliable transit systems, car users will most likely shift to mass transit use," he adds.

He also emphasizes that it is also important to make sure that the first- and last-mile of travel of car users is convenient and safe if they are to be encouraged shift to the mass transit system. The first- and last-mile of travel is the component of travel from home to the mass transit station and from the mass transit station to the end destination, and vice versa.

Using the co-benefit cost analysis model, Fillone explains that small cities like Baguio can develop a more efficient transport infrastructure and mass transit system that will also help keep their air pollution-free. With a new proposal under the Department of Science and Technology to apply the model on the entire Philippines transportation network, Fillone looks forward to helping develop the country's mass transit systems that involve not just land but also sea and air travels.



With year 2014 as baseline, the transport modeling of future scenarios was done for years 2020 and 2030.

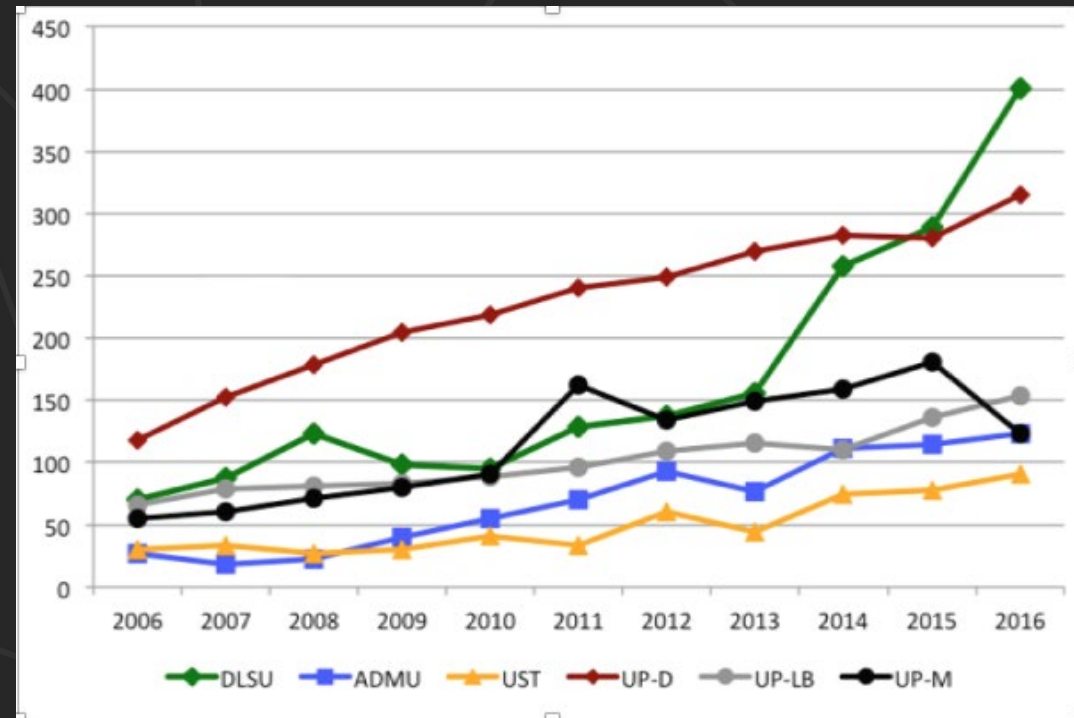
Dr. Alexis Fillone is a full professor of DLSU Civil Engineering Department.

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## How much do we contribute to global research?



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THE MOST PRODUCTIVE RESEARCH INSTITUTION IN THE PHILIPPINES

2014 - 2016

FOR THE THIRD CONSECUTIVE YEAR, De La Salle University is the country's most productive research institution based on publications indexed in Scopus.

DLSU breached the 400-mark in 2016 with 401 publications listed in the database as of the end of the first quarter of 2017. This figure represents a quadrupling of research output since 2010.

The second most productive was University of the Philippines-Diliman, with 313 papers during the same period. DLSU now has a cumulative record of 2,276 publications in the Scopus database, which is the second highest among local universities.

According to Elsevier, Scopus "is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research."



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