



UP MANILA 2058:

A Futures Roadmap for Resilient Health Systems and Education

Health Information Systems in the Philippines (2058)

Health Professions Education Delivery in UP Manila (2058)

Education of the Health Workforce in UP Manila (2058)



TABLE OF CONTENTS

MESSAGE	5
INTRODUCTION	7
SECTION: VISIONING THE FUTURES OF HEALTH INFORMATION SYSTEMS IN THE PHILIPPINES BY 2058	10
INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE	11
CAUSAL LAYERED ANALYSIS AND ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK	12
Social Factors	12
Technological Factors	14
Economic Factors	16
Environmental Factors	17
Political Factors	18
Key Factor Identification	19
Scoring process	19
STEEP factors	19
FUTURES TRIANGLE	25
Pulls of the Future	27
Pushes of the Present	27
Weight of History	29
SCENARIO BUILDING	31
Business as usual	31
Preferred Future	31
Disowned Future	32
Integrated Future	32
BACKCASTING THE PREFERRED FUTURE	34
Strategic Goal: Resilient and adaptive digital healthcare system	34
Strategic Goal: Functional, adaptive and resilient healthcare digital system	36
Strategic Goal: Integrated health information systems	36
ROADMAP OF THE HEALTH INFORMATION SYSTEMS IN THE PHILIPPINES BY 2058	38

SECTION 2: THE FUTURES OF HEALTH PROFESSIONS EDUCATION DELIVERY IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058	40
INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE	41
The Futures of Health Professions Education Delivery in UP Manila by 2058	41
Significance of the Focal Issue	43
CAUSAL LAYERED ANALYSIS	45
Litany or Problem	45
System	46
Worldview	47
Myth or Metaphor	47
ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK	50
Social factors	50
Technological factors	50
Environmental factors	51
Economic factors	51
Political factors	52
Key Factor Identification	52
IDENTIFYING PLAUSIBLE FUTURES THROUGH THE FUTURES TRIANGLE	57
Pulls of the Future: How do we want the desired futures of health professions education to look like?	59
Pushes of the Present: What is the status quo in health professions education?	59
Weights of History: What forces are holding us back from attaining this future?	62
Key Assumptions for the Weight of History	67
SCENARIO BUILDING	69
BACKCASTING THE PREFERRED FUTURE	71
Strategic Goal: Building tracks	71
Strategic Goal: Train on the tracks	72
Strategic Goal: Full speed ahead	72
ROADMAP TO THE FUTURES OF HEALTH PROFESSIONS EDUCATION DELIVERY IN UP MANILA BY 2058	73
Phase 1: 2024 - 2034	73
Phase 2: 2035 - 2045	74
Phase 3: 2046 - 2058	75

SECTION 3: THE FUTURES OF EDUCATION OF THE HEALTH WORKFORCE IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058	78
INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE	79
Health Workforce Education at the University of the Philippines Manila	79
Context	79
CAUSAL LAYERED ANALYSIS	82
ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK	83
Identification of Key Factors	87
IDENTIFYING PLAUSIBLE FUTURES THROUGH THE FUTURES TRIANGLE	90
Pulls from the Future	92
Pushes of the Present	92
Weight of History	92
SCENARIO BUILDING	94
Business-as-Usual	96
Preferred Future	96
Disowned Future	97
Integrated Future	97
BACKCASTING THE PREFERRED FUTURE AND ROADMAP OF THE FUTURES OF EDUCATION OF THE HEALTH WORKFORCE IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058	99
Strategic Goal: Foundational Enhancements	99
Strategic Goal: Strengthening Innovation and Infrastructure	99
Strategic Goal: Expansion and Institutionalization	100
Strategic Goal: National and Global Influence	100
Strategic Goal: UP Manila as a Global Leader in Healthcare Education	100
Final Vision (2058 and Beyond)	101
EPILOGUE	103
REFERENCES	104

Copyright © 2025 University of the Philippines Manila

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law.

Published by the University of the Philippines Manila
Address: 8/F, LCB, Philippine General Hospital Compound,
Taft Avenue, Ermita, Manila, Metro Manila, 1000, Philippines
Tel.: (+632) 8814-1218
Email: upm-ippao@up.edu.ph

This discussion paper is a project of the
Office of the Vice Chancellor for Research and Extension
University of the Philippines Manila.
Address: 8th Floor, Central Block, Philippine General Hospital Compound,
Taft Avenue, Ermita, Manila, Metro Manila, 1000, Philippines
Website: <https://www.upm.edu.ph/>
Email: upm-ovcre@up.edu.ph

MESSAGE

Leslie Michelle M. Dalmacio, PhD
Vice Chancellor for Research and Extension
University of the Philippines Manila



A warmest congratulations to the Futures Thinking Initiative Project, the Technical Working Group, and all the hardworking project staff for reaching this incredible milestone!

This discussion paper is more than just a written output; it is a testament to what collaboration, commitment, and forward thinking can achieve. It is the fruit of months of rigorous inquiry, creative imagination, and thoughtful analysis. At its core, it dares us to ask: what kind of healthcare, education, and workforce do we need to build for the Philippines by 2058?

This isn't just a guide, the Futures Thinking Roadmap is an important call to action. This is a clear message to our institutions that we can and must begin thinking long-term, imagining the futures we want, and working together to make these a reality.

This document shows that Futures Thinking is not just for visionaries or academics; it is a strategic tool for all. It's about preparing for a range of possibilities, understanding trends and emerging challenges, and making smart choices today that will benefit generations to come. Through this initiative, we as UP Manila are not simply keeping pace with change, we are choosing to guide it by shaping the future of health information systems, health professions education, and workforce development with a vision rooted in resilience, inclusivity, and innovation.

We especially celebrate the leadership of the Technical Working Group, the director, faculty members, research faculty, REPS and staff who rose to the challenge, embraced intensive training, and delivered outstanding work. You've shown us that foresight is not a luxury, it is a responsibility. With curiosity, courage, and collaboration, we truly can build a better tomorrow.

As UP Manila continues to lead in health professions education and research, this paper becomes a cornerstone that future students, educators, and leaders can build upon. As we conclude the first year of this initiative, let this be just the beginning. Let us keep asking the hard questions, keep envisioning bold futures, and continue working together to shape an institution that does not just respond to change but helps define it.

Together, let's make it happen!

ACKNOWLEDGMENTS

The development of the discussion paper *Make It Happen: The Future of Futures Thinking at UP Manila* was made possible through the invaluable support of many individuals and groups.

The University of the Philippines Manila extends our heartfelt gratitude to Senator Pia Cayetano, whose advocacy for Futures Thinking enabled the allocation of funds to state universities and colleges, paving the way for the establishment of the Futures Thinking Initiative Project in UP Manila.

The Technical Working Group is deeply thankful to the project staff, who through the leadership of Project Leader Dr. Leslie Michelle M. Dalmacio, and with the assistance of the OVCRE Staff, worked committedly toward the success of the project:

Former Senior Project Manager

Ms. Kim Rachelle Z. Onzaga

Junior Research Associate

Ms. Dianne Katherine A. Dela Torre

Project Staff I

Ms. Micah Glorice Tamayo-Garcia

We are also grateful to Dr. Emerito Jose A. Faraon for his steady guidance and support for the Technical Working Group. Our thanks go as well to Dr. Reginald G. Ugaddan, Assistant Professor at the UP National College of Public Administration and Governance (NCPAG) and Program Director of the Governance Futures Lab, for generously sharing his knowledge and advice to help UP Manila create its own framework, explore possible futures, and prepare a clear plan for the university's future.

Our appreciation also extends to the OVCRE staff for their continued support, and to the Publication Assistance Committee (Ms. Cheene Mabelle M. Calantoc and Dr. Harold D. De Guzman) for their valuable assistance in editing and refining this paper. We also thank Ms. Kim Rachelle Z. Onzaga for designing the Futures Thinking logo, and Razzielle H. Rios for the book cover layout.

INTRODUCTION

Dianne Katherine A. Dela Torre

The COVID-19 pandemic has disrupted health, education, economic activity, and society in general in the Philippines. It has taken millions of lives, burdened healthcare systems, affected economic growth within governments and communities, specifically in the rural parts of the Philippines. Health and sanitation concerns have also continued during the pandemic. In fact, these are among the poorest areas across the country, and the financial burden presented by COVID-19 put them at an even higher risk of falling deeper into poverty. Also, all Filipinos have been gravely impacted by the lockdowns and mobility restrictions in most areas of the nation, which have led to lost income and job opportunities for so many.

Senator Pia Cayetano stresses that the Philippines needs to urgently embed Futures Thinking into national policies so that the country can better anticipate and survive future crises. She said, if the country had planned 20 years ago, we would have been better prepared. COVID-19 underscored how unprepared systems could fail and how short-term solutions fall apart when a major crisis hits. In the year 2020, the State universities and colleges were provided with funds to further the initiatives on Futures Thinking. This resulted in the creation of the Futures Thinking Initiative Project at UP Manila, launched during the administration of then Chancellor Dr Carmencita D. Padilla, who oversaw its implementation. In line with this project, the Futures Thinking in Healthcare was established as a collaborative project between the Executive Director of the National Institutes of Health (NIH) and the Office of the Vice Chancellor for Research (OVCR) with the intent of anticipating the future needs and challenges of the said sector. Indeed, this initiative remains very viable and interactive to this date, encouraging strategic foresight and long-term planning within the University. To help the government understand these gaps and plan for a better future, UP Manila demonstrated early leadership in national discourse.

On July 14, 2020, the NIH and the Philippine General Hospital (PGH) issued a position statement in response to Senate Resolution No. 404. A team of experts from different health fields came together to explain what went wrong, what worked, and what long-term changes are needed, called the Technical Working Group (TWG). To provide evidence-based recommendations to the Senate Committee on Sustainable Development Goals, Innovation, and Futures Thinking. The report highlights the need to strengthen the health system of the Philippines in its response to COVID-19 and any future pandemic. The study called for the strengthening of public health emergency systems, enhancement of occupational safety, and increasing the capacity of local government units.

In 2023, Chancellor Michael L. Tee issued a directive to the Office of the Vice Chancellor for Research (OVCR) through CMLT Directive 2023-002 to institutionalize the Futures Thinking Initiative at UP Manila. The said directive is very significant due to the fact that the results of the said initiative shall provide the basis for the strategic responses of the University to emerging challenges, threats, and opportunities.

In 2024, UP Manila formally constituted its Futures Thinking Technical Working Group (TWG), composed of faculty members, research faculty, and REPS was convened to advance strategic foresight at UP Manila. Their mandate includes: finding emerging trends, doing horizon scanning and scenario planning, recommending future-oriented academic and research pursuits, and participating in long-term strategic visioning. By aligning with national research priorities such as the National Unified Health Research Agenda (NUHRA) 2023–2028 and PAGTANAW 2050, it strengthens its position in directing the creation of a health and research environment that is more flexible and forward-thinking. The introductory meeting introduced the TWG and project staff, reviewed college vision, mission and goals (VMGs), planned activities, and outlined the University's Futures Thinking Initiative, including the proposed University Futures Masterclass in collaboration with UP National College of Public Administration and Governance (UP NCPAG).

The TWG began its work through participation in the University Futures Masterclass, held from September 9 to 11, 2024, at the Admiral Hotel Manila. The event was co-hosted by the Office of the Vice Chancellor for Research under the leadership of Dr. Leslie Michelle M. Dalmacio in collaboration with the (UP NCPAG) Governance Futures Lab. Designed by the Philippine Futures Thinking Society (PhilFutures) together with the Center for Leadership, Communication, and Governance Inc. (CLCGi), the masterclass equipped is designed to provide participants with a strong appreciation of futures thinking and strategic foresight, and to show how these approaches can be integrated into public organizations such as the UP Manila. At the end of the program, participants are expected to understand key frameworks and processes, explore possible University futures, and help develop a Futures and Foresight Framework for a defined time horizon. The delivery of the program is through sessions and workshops that introduce foundational concepts: the principles of futures thinking, causal layered analysis (CLA), environmental scanning using the STEEP framework, the Futures Triangle, and scenario exploration.

The participants will present their synthesized insights, scenarios, and strategic recommendations for their focal issues, demonstrating their enhanced capacity in futures thinking and strategic foresight. The main task of the workshop was to envision UP Manila in 2058. Participants were divided into three groups each being tasked to focus on different main

topics. Results of these discussions formed the base of what would later become the UP Manila Futures Roadmap.

The TWG put these tools to further use after the master class in structured learning exercises that tested possible futures of UP Manila and the greater health sector. These initial outputs represent demonstrations of the learning undertaken. Guided by Dr Reginald Ugaddan, this group refined the analyses through successive meetings and collaborative sessions, which eventually led to the creation of the UP Manila Futures Roadmap-an outline of probable directions for the future of healthcare, education, and workforce development.

The Roadmap focuses on three key areas:

- **Health Information Systems in the Philippines (2058)**
- **Health Professions Education Delivery in UP Manila (2058)**
- **Education of the Health Workforce in the University of the Philippines Manila by (2028)**

To further strengthen this continuity, UP Manila created the Futures Thinking Initiative Project (Phase II) Ad Hoc Committee last May 19, 2025. While the majority of its members come from the original TWG, the committee has also included newer members who bring in wider insights and expertise. The committee is primarily tasked to enhance the three strategic areas and develop them as full scholarly papers.

The TWG remains committed to producing three scholarly outputs for publication:

- **Visioning the Futures of Health Information Systems in the Philippines to 2058**
- **The Futures of Digitalizing Health Professions Education in the Philippines: A Causal-Layered Analysis**
- **The Futures of Health Research Education in UP Manila by 2058**

SECTION 1

VISIONING THE FUTURES OF HEALTH INFORMATION SYSTEMS IN THE PHILIPPINES BY 2058

Contributors:

Dr. Maria Llaine J. Callanta

College of Medicine

Assoc. Prof. Joey Mark S. Diaz

College of Arts and Sciences

Ms. Ericka Louise C. Gilo

Philippine General Hospital

Dr. Leizel P. Lagrada

College of Public Health

Assoc. Prof. Kathyleen S. Nogrado

College of Public Health

Asst. Prof. Frederick S. Nieto

National Teacher Training Center for the Health Professions

Dr. Filedito D. Tandinco

School of Health Sciences

Ms. Kathlyn Sharmaine Valdez

Philippine General Hospital

INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE

Health Information Systems (HIS) in the Philippines face significant challenges that may impact its development and growth by 2058. Access to comprehensive, real-time patient data remains a critical issue that hinders effective medical decision-making across various healthcare settings. The lack of a centralized database for patient information is a major barrier, preventing healthcare providers from fully understanding both the past and present medical statuses of patients (Conforti, 2025).

The integration of HIS must manage not only technical aspects such as data standardization and system interoperability but also address security concerns and compliance with health data regulations, which are crucial for protecting patient information against cyber threats.

The future of HIS in the Philippines will heavily depend on the ability to adapt to advancements in digital technology while considering the economic and political landscape. By 2058, the aim is to develop systems that can seamlessly integrate data across levels of health facilities, from barangay health stations and health centers to end referral hospitals, to ensure continuity of care and enhancement of healthcare pathways. This requires overcoming current interoperability challenges and ensuring that all systems can communicate effectively across the healthcare network. HIS enhancements in institutions such as University of the Philippines (UP) System and Philippine General Hospital (PGH) may serve as a scalable model and guide efforts for improving HIS nationwide.

These efforts align with specific SDGs: Good Health and Well-being, Quality Education, Decent Work and Economic Growth, and Reduced Inequalities. Achieving these goals will require a concerted effort from multiple stakeholders, including hospital administrations, professional societies, national agencies, and local government units, to reframe HIS as a foundational element of healthcare infrastructure in the Philippines.

CAUSAL LAYERED ANALYSIS AND ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK

Social Factors

The population demographics in the Philippines is described to be relatively young. According to the Philippine Statistical Authority (PSA), the projected population in 2025 compose 46% of young people ages 0-24, while the elderly population aged 60 years old and above constitute 10% of the projected 114,124 in 2025. The population, however, will become elderly with a declining total fertility rate. By 2055, the young population (ages 0-24) will constitute 35% of the population, while the proportion of the elderly (60 years old and above) is projected to double at 19% of the population, with the increasing number of individuals at extreme ages exerting greater demands on the health care system.

The Philippines has a robust cadre of skilled professionals adept in delivering training programs for HIS personnel. These experts, sourced from both academic and practical domains, augment the nation's ability to expand HIS-related activities. Moreover, partnerships with other universities and international organizations facilitate the initiation of HIS initiatives, acquisition of financial grants, and execution of significant analytics and research. The Network Readiness Index (NRI) positions the Philippines 63rd among 133 economies, indicating moderate advancement in the utilization of information and communication technology (ICT). The "People" pillar of the NRI exhibits a score of 50.4 and a rank of 33, reflecting notable advancements in ICT uptake and utilization. The sub-pillar "Individual" ranks 7th globally, with a score of 71.10, demonstrating strengths in mobile broadband internet traffic, ICT integration in education, virtual social network involvement, and adult literacy. These measures highlight the nation's social preparedness to endorse HIS efforts. The use of ICT in education, along with elevated literacy rates, promotes the acceptance and durability of HIS training programs. Utilizing these social and technological resources offers a chance to establish a strong training ecosystem, effectively addressing deficiencies in HIS implementation and guaranteeing sustained impact (Majumdar, S., 2024). Moreover, in terms of socio-cultural implication of improving HIS in the Philippines, the Filipinos have an openness to share data/information as 80% of the Philippine Internet population uses social media (Foundation for Social Media Alternatives (FMA)) .

The societal context in the Philippines, however, poses numerous significant problems that jeopardize the effective execution and sustainability of the Health Information System (HIS). These hazards stem from challenges related to literacy, digital competencies, trust, equity, and ethical considerations, underscoring the intricate interaction of societal variables in promoting HIS adoption.

a. Challenges in Educational and Digital Literacy.

Despite a high adult literacy rate of 97%, fundamental learning deficiencies remain. In 2022, the World Bank reported that 90% of Filipino children aged 10 were learning-deficient, unable to read and comprehend basic text. The disparity between fundamental literacy and

functional health literacy constitutes an obstacle to HIS engagement, since most Filipinos may find it challenging to interact proficiently with digital health resources. The persistence of inadequate digital health literacy constitutes a considerable challenge. Only 40% of Filipinos possess at least one of the six ICT competencies being tracked for the Sustainable Development Goals (SDGs), indicating a deficiency in digital competence that restricts a significant segment of the population from accessing, interpreting and utilizing HIS efficiently.

b. Misinformation, Disinformation and Distrust in Scientific Discourse

The rising incidence of disinformation erodes trust in health information systems, with 59% of Filipinos expressing apprehension in 2024, an increase from 56% in the previous year. Moreover, more than half of Filipino people express challenges in recognizing misinformation, underscoring weaknesses in distinguishing credible health information. The lack of trust in science intensifies this problem, perhaps resulting in opposition to the adoption of HIS systems that depend on evidence-based methodologies.

c. Data Privacy and Ethical Concerns

Concerns around data privacy and ethical implications of data sharing, security, and misinterpretation present substantial risks to the societal acceptability of HIS. These issues may lead Filipinos to be reluctant to utilize HIS platforms due to fears of data breaches, the exploitation of personal health information, or unethical management of sensitive data. This distrust can undermine the credibility and implementation of HIS projects.

d. Equity and Accessibility in Health

Health equity continues to be a significant concern, especially for underrepresented communities like the indigenous populations, due to language barriers and cultural disparities that limit their access to HIS and other digital health services. This limitation widens the digital divide, depriving poor communities of access to critical health information and services.

The interaction of these societal hazards exacerbates the difficulties encountered in HIS implementation. Misinformation and inadequate digital literacy collectively amplify distrust, while language challenges and health disparities further disadvantage the marginalized populations. Mitigating these concerns necessitates focused actions, including educational initiatives to improve digital and health literacy, efforts to foster trust in scientific inquiry, and legislation to protect data privacy and uphold ethical standards. By acknowledging and addressing these social determinants, HIS projects become more inclusive and effective at enhancing health delivery throughout the Philippines.

Technological Factors

The technical environment in the Philippines offers various options to enhance the development and execution of HIS. Utilizing these opportunities can substantially improve the nation's ability to provide effective and equitable healthcare services.

a. Extensive availability of mobile devices and computers

Young Filipinos have extensive access to mobile phones and computers, establishing a robust basis for the incorporation of technology into healthcare. The National Demographic and Health Survey reported that 92% of Filipino households own a mobile phone and 30% own a computer. Their proficiency with digital technologies fosters an atmosphere conducive to the adoption and use of HIS, enhancing the accessibility of health information and promoting involvement with digital health initiatives.

b. Progressions in Artificial Intelligence (AI)

The use of AI into healthcare systems presents transformative possibilities for HIS. AI-driven algorithms can assist in medical diagnosis by evaluating patient test results and other clinical data, assist in supply chain management, facilitating expedited and precise decision-making. These innovations can boost patient outcomes, optimize resource distribution, and improve the overall efficiency of healthcare delivery.

c. Cloud storage solutions

Cloud technology as a storage option offers a scalable and safe method for managing extensive patient data sets. It facilitates instantaneous access, effortless data exchange among healthcare providers, and comprehensive disaster recovery functionalities. This strategy can mitigate issues related to data storage constraints and guarantee the uninterrupted functioning of HIS operations, even in emergencies.

Central to these innovations is interoperability, the ability of different systems and devices to exchange, interpret and use data consistently. Without interoperability, advances in artificial intelligence, telemedicine and electronic records will remain siloed, limiting the benefits of digital transformation in healthcare.

d. Open-source platforms

Open-source platforms provide economical options for the development and improvement of HIS. These platforms can be utilized to disseminate health information, consolidate diverse data sources, and develop bespoke health solutions aligned with the country's requirements. By utilizing these complementary resources, the Philippines can expedite the implementation of breakthrough HIS technologies while reducing development expenses.

e. Current health information services

The Philippines possesses a foundational framework of health information services, including the ATIPAN project and 19 operational HIS platforms, with an additional six planned for installation. These systems can function as foundational elements for data collection, analysis and integration, minimizing the necessity to construct HIS infrastructure from the ground up. Augmenting and refining these current services can result in more integrated and thorough health data management.

Recent advancements underscore the potential to improve connectivity and accessibility, which are crucial for the proper execution of HIS. The unified tower policy and network development was implemented in May 2020 by the Department of Information and Communications Technology (DICT). This agency is promoting the establishment of independent cell towers to enhance mobile network coverage. In 2022, the Philippines possessed 22,405 cell towers managed by three principal telecommunications providers; however, the government estimates an additional 60,000 towers by 2031 to adequately cover unserved and underserved regions. This policy and proposed expansion facilitate the extension of mobile network access to remote areas, hence promoting wider integration of HIS nationwide. Enhanced connectivity will enable real-time data acquisition, telemedicine services, and the distribution of essential health information.

Additionally, progress such as the fixed broadband network is significant. As per Ookla® Speedtest Intelligence®, the nation attained a speed of 94.42 Mbps in Q2 2024, nearly corresponding to the global average of 94.52 Mbps. This enhancement signifies continuous investments in network infrastructure, capable of accommodating data-intensive applications like electronic medical records, teleconsultations, and AI-driven health analytics. Dependable and expedited broadband connections serve as the foundation for effective HIS operations, facilitating uninterrupted data transmission and improved user experiences. The continuous expansion of mobile networks and broadband services presents an opportunity to mitigate the digital divide in healthcare. Extending reliable connectivity to unserved and underserved regions can enable these groups to utilize digital health services, thereby addressing disparities in healthcare provision and fostering health equity.

The technical environment in the Philippines poses considerable hurdles that jeopardize the efficient execution and sustainability of HIS. These difficulties underscore the deficiencies in digital infrastructure, cybersecurity, and resource allocation, especially inside healthcare facilities and marginalized areas.

Cybersecurity issues, inadequate digital infrastructure, erratic electricity and electrification disparities, hinder the effective implementation of HIS in the Philippines. As digital transformation advances in healthcare, cybersecurity emerges as a significant danger due to amplified susceptibility to cyberattacks, data breaches, and unauthorized access. Inadequate cybersecurity safeguards jeopardize critical health information, potentially undermining trust in HIS and hindering user uptake. Second is inadequate digital infrastructure in health facilities. Investment in ICT is critically low among health facilities, with about 6% having internet connectivity, as per DICT Free Wi-Fi data from 2020. The deficiency of digital infrastructure significantly constraints health facilities' capacity to deploy HIS, employ telemedicine or effectively share health information. It also establishes a substantial obstacle to the nationwide implementation of HIS solutions. Next is erratic electricity and electrification disparities. Infrastructure issues encompass fundamental utilities, with 3.68 million households lacking reliable electricity. Moreover, as of June 2024, hardly 2 out of 117 regions in the Philippines have attained complete electrification. This energy insecurity restricts digital health adoption in underserved regions and undermines operational reliability of HIS, especially during natural

disasters or emergencies. The interaction of cybersecurity threats, insufficient digital infrastructure, and deficiencies in electrification exacerbates the difficulties of HIS implementation. Health institutions in underserved regions, already facing challenges due to inadequate ICT investments, are additionally hindered by inconsistent power supply, rendering them ill-prepared to implement and maintain HIS solutions. Mitigating these technological dangers necessitates a multifaceted strategy, encompassing investments in cybersecurity frameworks, ICT infrastructure within healthcare facilities, and electrification initiatives. Addressing these obstacles is crucial for the equitable and effective implementation of HIS in the Philippines, facilitating enhanced healthcare delivery across the nation.

Economic Factors

The economic environment in the Philippines presents favorable prospects for the enhancement of HIS. Investment patterns, industry expansion, and rising demand for digital health solutions underscore the potential for economic advancement in the healthcare sector. The digital health market in the Philippines is anticipated to yield revenues of over USD 830 million in 2024, with a compound yearly growth rate (CAGR) of 10.60% from 2024 to 2029. This substantial growth indicates the growing readiness of investors to finance technological innovations in healthcare. Such investments can offer essential assistance for the creation and execution of HIS, allowing healthcare providers to embrace novel tools and systems that improve service delivery. Additionally, the digital health market includes multiple areas, such as digital fitness and well-being, online doctor consultations, and digital treatment and care. The sector's swift growth is propelled by the increasing demand for healthcare solutions that emphasize convenience, accessibility, and enhanced patient outcomes. This movement highlights the economic feasibility of HIS, as it corresponds with the larger digital health ecosystem, creating opportunities for partnerships and funding to improve HIS infrastructure. The expansion of the digital health sector also generates economic incentives for stakeholders to invest in development of HIS. Healthcare providers, technology firms, and politicians may capitalize on this economic momentum to deploy scalable HIS, decrease operating expenses, and enhance efficiency in healthcare delivery. This may stimulate employment development in healthcare IT and associated sectors, contributing to general economic expansion. This burgeoning digital health sector and rising investments in healthcare technology offer a robust basis for enhancing HIS in the Philippines. By leveraging these trends, the nation may cultivate a more efficient, accessible, and technologically advanced healthcare system, thereby ensuring improving health results for its populace.

While the economic landscape presents potential for the enhancement of HIS in the Philippines, yet, substantial problems concerning sustainability, resource distribution, and political priorities persist. These challenges may impede the sustained advancement and efficient execution of HIS nationwide. Establishing and sustaining the infrastructure necessary for HIS demands significant financial investment and strategic long-term planning. The sustainability of these buildings poses a significant difficulty, as several health institutions lack adequate money for ongoing upgrades, upkeep, and expansions. In the absence of stable

financial support, HIS infrastructure is at risk of becoming obsolete, inefficient, or nonfunctional over time.

The successful execution of HIS relies on sufficient allocation of resources, encompassing personnel, financial support, and technology. However, numerous healthcare institutions encounter restricted resources and staffing deficiencies, hindering their capacity to implement and maintain HIS solutions. The deficiency of skilled professionals in healthcare IT intensifies the difficulty, constraining the capacity to scale HIS projects to address population needs. The distribution of resources for HIS development is fundamentally based on political prioritization. Conflicting needs for governmental financing and focus can lead to restricted investments in HIS programs. In the absence of robust political will and dedication to prioritize digital health efforts, budget allocation may be inadequate, hindering the advancement of HIS adoption and its integration into the wider healthcare framework. Therefore, the sustainability of HIS facilities and infrastructure, along with difficulties in resource allocation and political priority, presents economic obstacles to the advancement of a strong HIS in the Philippines. Confronting these difficulties necessitates strategic planning, augmented funding allocations, and advocacy to promote HIS as a national priority. By surmounting these obstacles, the nation may establish a more robust and sustainable HIS framework that aligns with its long-term health objectives.

Environmental Factors

The Philippines aims to enhance renewable energy sources, targeting a 35% renewable energy share by 2030 and 50% by 2040. This initiative is critical to addressing the ongoing energy crisis while transitioning towards sustainable power sources, including solar, geothermal, wind, and hydro (Department of Energy, 2022). Additionally, Green Information Technologies are being implemented to reduce the environmental costs associated with the country's extensive communication networks, enhancing energy efficiency and reducing operational emissions in the health information sector (Hernandez & Ona, 2015).

The archipelagic nature of the Philippines, coupled with its susceptibility to natural disasters, necessitates robust, decentralized health information systems that can operate autonomously during infrastructural disruptions. The disparity between rural and urban areas in terms of internet quality and power supply poses significant challenges in the implementation and efficacy of health information systems. Tailored solutions are required to address the specific needs of each community effectively.

The environmental cost of digitalization is another critical issue. The disposal of electronic technologies contributes to significant environmental degradation, with only 10-40% of e-waste being recycled. The rest is often dumped in landfills, releasing harmful chemicals into the environment (Rucevska et al., 2015). Moreover, the health sector, a major contributor to global data production, accounts for about 30% of the world's data. The operation of data centers, particularly those involved in cloud services, consumes substantial amounts of electricity, primarily for cooling systems needed to manage the heat generated by servers (Adamson, 2020).

Looking forward, it is essential for the Philippines to continue developing and integrating advanced renewable energy technologies within its HIS Innovations such as biodegradable batteries and solar-powered data centers could redefine energy use in healthcare. Moreover, policymakers must adapt regulations and support infrastructure developments that bolster the resilience and sustainability of health information systems against environmental challenges, ensuring they are prepared for future demands.

Political Factors

The political landscape in the Philippines presents both enabling conditions and persistent challenges for the development of an integrated, interoperable and equitable HIS. At the national level, the Universal Health CARE Act (RA 11223) provides the overarching policy framework for establishing the National Health Data Repository and implementing a unified Health Information System. These mechanisms are intended to ensure that all Filipinos are guaranteed equitable access to quality and affordable health care goods and services. Complementing this mandate, the Department of Health's Eight-Point Agenda identifies ""teknolohiya para sa mabilis na serbisyong pangkalusugan"" as a priority area, emphasizing the use of digital health technologies to streamline administrative procedures, strengthen data management and PhilHealth benefit payments, and establish governance mechanisms such as the Interagency Digital Health steering committee, technical working group and experts groups to guide the implementation of Philippines Digital Health Interventions.

The Department of Information and Communications Technology (DICT) complements these efforts by providing the necessary digital infrastructure through initiatives like the National Broadband Plan and the Unified Tower Policy, which expand connectivity and support secure data exchange across health facilities. Its role in cybersecurity, interoperability and e-governance ensures that health data systems remain reliable, accessible and compliant with the national standards. These are reinforced by interagency collaboration under the Philippine eHealth Governance Framework and the DOH-PhilHealth Joint Administrative Order No. 2021-0002, which mandates the adoption of the national health standards for interoperability, ensuring that all electronic health systems, both in public or private sector, adhere to a shared framework for secure, consistent and ethical data exchange. Public-private partnerships (PPP) and compliance with the Data Privacy Act of 2012 further strengthen the digital health ecosystem through research, innovation and protection of patient information.

However, persistent challenges remain. Fragmented service delivery due to devolution continues to limit uniform HIS implementation, while political conflicts in some geographical areas in the southern regions of the country as well as fluctuating budget allocation for DOH and PhilHealth as seen in 2024 hinder progress and disrupt the continuity of HIS projects [Accessed online: <https://www.ibon.org/2024p-health-cuts/>]. Global political events, such as the Trump administration's defunding of WHO and USAID, illustrate how international dynamics can undermine domestic health system investments. Sustained political commitment, stable financing and interagency coordination particularly among DOH, DICT and Philhealth

are essential to institutionalize interoperability not only as a technical specification but as a governance principle enabling integrated, equitable and data-driven health systems

Key Factor Identification

Scoring process

In Futures Thinking and Foresight methodology, the process of identifying and scoring key factors is essential for understanding potential impacts on the future landscape. This process begins with the identification of key elements such as trends, uncertainties, and driving forces that are relevant to the area under study. Experts gather and list these factors based on comprehensive research, expert opinions, and trend analysis.

The next step involves scoring these identified factors according to several criteria: *Impact, Uncertainty, Relevance, and Controllability*. Each factor is assessed on a scale of 1 (low) to 5 (high) for Impact, Uncertainty, and Relevance to determine the potential magnitude of effect, degree of unpredictability, and significance to the organization, respectively. Controllability is evaluated inversely, with 5 indicating very low control and 1 showing high control, representing the extent to which the organization can influence the factor.

To calculate the total score for each factor, scores are added up from each criterion. Different weights may be applied to these criteria based on their strategic focus. By weighting the scores, one can tailor the analysis to reflect specific strategic priorities and concerns more accurately.

After scoring, the factors are prioritized to focus resources and planning efforts on the most influential elements. This prioritized list of factors serves as a foundation for developing detailed future scenarios, which are narratives or models that illustrate possible futures based on how these key factors might evolve or interact. This structured scoring and analysis process aids organizations in strategic planning, helping them prepare for future challenges and opportunities effectively.

STEEP factors

In the process of developing future scenarios for Health Information Systems (HIS) in the Philippines, a comprehensive analysis of STEEP factors (Social, Technological, Economic, Environmental, Political) was conducted. The analysis revealed key factors that are expected to influence the future of HIS.

Social factors such as digital health literacy, distrust in the healthcare system, data privacy concerns, ethical considerations, and health equity are pivotal. **Technological factors** identified include cybersecurity threats and the need for robust digital infrastructure. **Economic factors** focus on the sustainability of facilities and infrastructure essential for building HIS and the allocation of resources influenced by political prioritization. **Environmental factors** highlight the geographic features of the Philippines, such as the prevalence of natural calamities

and access issues between urban and rural communities, along with concerns about quality internet access, limited power supply, and energy shortages due to the depletion of natural resources. **Political factors** include the continuity of government projects, conflicts in the Autonomous Region in Muslim Mindanao (ARMM), and the devolution of the health system.

The top ten key factors were scored based on their impact, uncertainty, relevance, and controllability (Table 1.1). Leading the list are the geographic features related to natural calamities with a total score of 18, underscoring their significant potential impact and relevance. This is followed by the sustainability of HIS infrastructure and ethical considerations, both scoring 17. Health equity also emerged as a critical factor with a score of 17, reflecting its high impact and relevance. Other notable factors include energy shortages, distrust in the system, and challenges related to the internet and power supply, each scoring 15. Political factors like continuity of projects and local conflicts, along with the devolution of the health system, similarly highlighted their significant influence on the future of HIS in the country. A discussion of the top ten factors are outlined below.

Table 1.1. Top ten key factors were scored based on their impact, uncertainty, relevance, and controllability

STEEP Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Geographic feature of the country (presence of natural calamities)	5	4	5	4	18
Sustainability of facilities and infrastructure for building HIS	5	3	5	4	17
Ethical consideration	5	4	5	3	17
Health equity	5	4	4	4	17
Energy shortage - depletion of natural resources	5	3	4	3	15
Distrust in the system	4	3	4	4	15
Quality internet and limited power supply	4	3	5	3	15
Political continuity of projects of the government	5	4	4	2	15
Local/International conflict/s	4	3	4	4	15
Devolution of health system	5	2	4	4	15

Geographic feature of the country (presence of natural calamities).

The geographical features of the Philippines, such as its archipelagic nature, mountainous terrain, and vulnerability to natural calamities, significantly influence the development, accessibility, and efficiency of the country's Health Information System (HIS). These features create both challenges and opportunities for implementing an effective HIS.

Scoring rationale: The impact of the geographical features of the country is high (5) as

the Philippines being an archipelagic country located in the Pacific Ring of Fire and Typhoon Belt, any disruptions such as calamities and disasters can greatly affect the stability of the HIS. Uncertainty is also high (4) due to unpredictable disasters. There is also variability in the technological readiness across different geographical areas. The relevance is high (5) as it is a crucial factor in the development and functionality of HIS. Controllability is relatively low (4), while preparedness measures and risk mitigation can lessen the impact, the country has limited control over natural hazard and environment hazards.

Sustainability of facilities and infrastructure for building HIS

Hospital information systems rely on digital infrastructure that must be maintained and upgraded for long-term use. Physical structure and reliable network infrastructure are important in the operation of HIS. It should be able to support data storage and ensure security of data. In the local context, the infrastructure landscape of HIS still faces a lot of challenges. Disparities in resource allocation across political regions lead to unequal distribution of resources for development of HIS infrastructure, especially in poor regions.

Scoring rationale: Sustainability of facilities and infrastructure is high (5) as HIS is dependent on sustainable infrastructure. Uncertainty is moderate (3) as the development of infrastructure relies on different factors such as funding and technological capacity. Relevance is high (5) as continuity of operations depends on the facilities and infrastructure. Controllability is relatively low (4) as ensuring long term sustainability is constrained by budget limitations, bureaucratic process and overall institutional capacity. The ability of agencies to maintain HIS and ensure consistent improvements will be difficult to control

Ethical Consideration

HIS plays a crucial role in managing patient data and improving healthcare delivery. However, several ethical considerations must be addressed to ensure respect for patient rights, promote equity, and maintain trust in the healthcare system.

Scoring rationale: The impact of ethics in HIS is high (5) as there are several ethical considerations that need to be addressed prior to implementation of a unified HIS. Uncertainty is also relatively high (4) because of the various stakeholders that need to be consulted and considered. Relevance is also given a high (5) score since the trust of the people heavily relies on several ethical considerations. Controllability is given a moderate (3) score since further studies and consultations should be conducted to fully understand the people's concern in using an information system to record and manage health data.

Health Equity

Health equity profoundly impacts HIS by shaping how data is collected, analyzed, and utilized to address disparities in healthcare access and outcomes. Veinot et al. in 2018 proposed that health informatics interventions pose a particular risk of producing intervention-related inequality because they are likely to disproportionately benefit more advantaged people. The information technologies through which we deliver informatics interventions are

disproportionately available to well-off, educated, young, and urban patients (Lorenc & Oliver, 2013)

Scoring rationale: The impact of health equity in HIS is high (5) as it will be difficult to produce an information system that will be able to cater to people from socioeconomic backgrounds, and institutions and health facilities with different levels of resources. Uncertainty, relevance and controllability are all scored moderately high (4). Further studies are needed on how to build an HIS that will eliminate socioeconomic bias and reduce equity harm. Health disparities are thought to emerge from health system disparities and socioeconomic factors that create differential access to “flexible resources” including money, status, power, freedom, knowledge, and social capital, in which some will be difficult to control and measure.

Energy shortage

Energy shortages can significantly disrupt Health Information Systems (HIS) by compromising the functionality of healthcare facilities. These disruptions lead to data loss, reduced access to health technologies, and impaired communication, which ultimately affect patient care quality, data integrity, and the overall efficiency of health services.

Scoring rationale: Impact is high (5) as the functionality of the infrastructure of HIS heavily relies on energy. Inadequate power supply can result in data loss if systems are not properly backed up. Uncertainty is moderate (3) as impact planning and emergency preparedness can reduce the variability of the effect of energy shortage to HIS. Relevance is high (4) this can greatly affect operational continuity, data security and data integrity. Disruptions in energy can result in disruptions in service delivery. Controllability is moderate (3) as we can include planning and investment on mitigation in planning the HIS.

Distrust in the system.

Distrust in the healthcare system in the Philippines can stem from multiple sources, including past policy failures, perceived inefficiencies, and concerns over data privacy and security. With the increasing digitization of health records through Health Information Systems (HIS), there is a growing concern among the public about the security and confidentiality of personal health information. Incidents of data breaches or unauthorized data access further exacerbate these fears, undermining trust in HIS initiatives (Fowler, 2021; Sangfor, 2024, Yondu, n.d.). The Philippine Data Privacy Act of 2012 (Republic Act No. 10173) plays a crucial role in this context. It sets out clear guidelines for the collection, processing, and securing of personal information, imposing strict penalties on violations to safeguard individual privacy. Despite these regulations, the enforcement and compliance levels vary, which can contribute to public skepticism regarding the effectiveness of data protection practices within healthcare settings.

Scoring rationale: The impact of distrust is high (4) because it directly affects HIS adoption rates and operational efficiency. Uncertainty remains moderate (3) due to the variability in the enforcement of data privacy laws. The relevance is also high (4) as trust is essential for the successful integration of HIS into daily healthcare practices. Controllability is relatively low (4), suggesting that through rigorous data protection and compliance with

privacy laws, healthcare providers can significantly influence public trust.

Quality internet and limited power supply

Reliability of the internet and power supply is crucial for HIS functionality. In the Philippines, inconsistent internet quality and frequent power outages, especially in rural areas, pose significant challenges to HIS reliability and continuous operation.

Scoring Rationale: The impact is high (4) as these infrastructural deficiencies directly affect HIS functionality. Uncertainty about when and how these issues will be resolved is moderate (3), and relevance is very high (5) because without reliable infrastructure, HIS cannot operate effectively. Controllability is moderate (3) because while some infrastructure improvements can be managed locally, others depend on broader national initiatives.

Political continuity of projects of the government

Political shifts can significantly affect the continuity of HIS projects. Changes in administration often lead to shifts in healthcare priorities and funding, which can disrupt ongoing and planned HIS initiatives.

Scoring Rationale: The potential impact of political changes is very high (5), as they can fundamentally alter the trajectory of HIS projects. The uncertainty is also high (4) due to the unpredictable nature of political commitments across electoral cycles. The relevance is high (4), reflecting the dependence of HIS success on stable political support. However, controllability is high (2), as influencing political processes through continuous stakeholder engagement, continuous dialogues with policymakers and alignment of HIS with national priorities can be initiated by healthcare leaders and project managers.

Local/international conflict/s

Local and international conflicts can divert resources and focus away from healthcare infrastructure projects like HIS. These conflicts can also threaten the physical and cybersecurity infrastructure needed for HIS.

Scoring Rationale: The impact of conflicts is high (4) as they can cause immediate and severe disruptions. The uncertainty associated with these conflicts is moderate (3), considering historical conflict dynamics and peace efforts. The relevance is high (4), given that stability is crucial for healthcare project success. Controllability is moderate (4), with some aspects of conflict mitigation being manageable through strategic planning, though direct control is limited.

Devolution of health system

The decentralization of healthcare management to local governments under the Local Government Code affects the uniform implementation and management of HIS across the Philippines, impacting standardization and interoperability.

The impact of health system devolution is very high (5) as it affects how health

technologies and systems are implemented across different localities. The uncertainty is low (2), given the established process of devolution, though its effects vary. The relevance is high (4), due to the need for cohesive HIS operations nationwide. Controllability is moderate (4), as national policies and guidelines can influence local implementations to some extent.

FUTURES TRIANGLE

The Futures Triangle is a tool used in futures studies to help understand and organize thoughts about the future. It is based on three key components:

- **Pulls of the Future:** These are the attractive elements that influence change/draw us towards a desired future. They represent the hopes, dreams, and visions that people have about what they want the future to look like.
- **Pushes of the Present:** These are the current trends, innovations, and dynamics that propel/change us forward. They include existing technologies, social movements, economic conditions, and policies that influence the direction of future developments.
- **Weights of the Past:** These are the legacies, traditions, and historical factors that hinder/hold us back or slow down progress. They include outdated technologies, old habits, previous investments, and cultural norms that can impede change.

The Futures Triangle diagram for HIS in the Philippines is shown in Figure 1.1 in the following page.

Current CLA (2024)

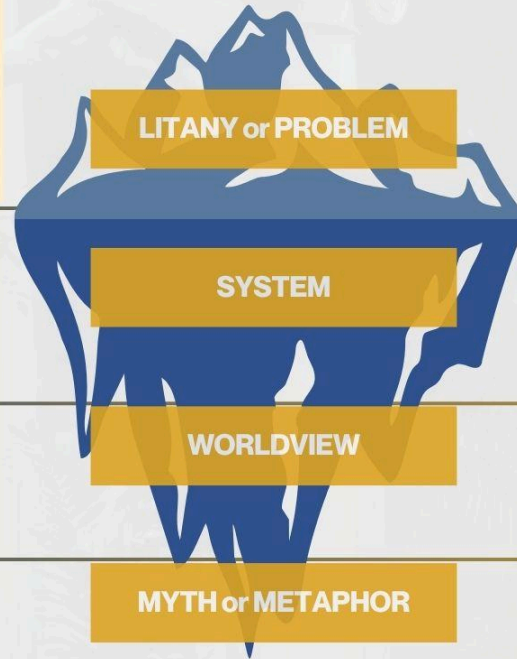
- Disruption of classes and clinicals due to suspensions
- Baseline competencies are not met with the current modes of delivery of remote learning
- All stakeholders lack the equipment for remote learning
- Colleges are in silos.

- National LGU policies on class delivery during disasters and typhoons
- University policies on class suspensions
- Bureaucratic processes are not streamlined
- The budget for remote learning is difficult to access
- Insufficient internal infrastructure
- Lack of training for all stakeholders on conducting / performing remote learning

Pwede na/ Puro na lang resilience

“Malayo pa ang umaga.”

Causal Layered Analysis



LITANY or PROBLEM

SYSTEM

WORLDVIEW

MYTH or METAPHOR

Transformed CLA (2058)

- Self-directed learning, complemented by advanced teaching-learning technologies, is integrated into all UP Manila course instruction.
- Learning is uninterrupted and resilient to external events (e.g., public health problems, disasters)
- All stakeholders are sufficiently trained and empowered to adapt to advanced teaching-learning technologies.
- Graduates of the university are world-class but culturally-responsive to the needs of the Filipino society.
- Inter-professional education and collaboration is fully embedded and practiced in course development and delivery.
- Adequate funding for advanced educational technologies in health professions education.

- Local and institutional DRRM policies for SUCs are institutionalized and fully implemented.
- Provision of flexible learning options among institutions during public health problems disasters
- Adequate funding for education (training of teachers, provision of appropriate equipment, learning management system, etc.)
- Adoption of self-directed learning strategies across courses, independent of the external situation

Hindi pwede ang pwede na

“Morning has broken.”

Figure 1.1. Futures Triangle diagram for HIS in the Philippines.

Pulls of the Future

Philippine HIS pulls of the future focus on enhancing the efficiency, equity, and security of health data management and healthcare delivery:

Interoperability of Data

The committee envisages a HIS through which data are seamlessly shared across different hardware and software, and utilized by various public and private stakeholders at all levels of care. This will enable more efficient patient care management, reduce redundancy, and improve the speed and accuracy of healthcare services.

Sustainable and Integrated Infrastructure

The committee envisages a robust infrastructure and human resource development system that supports monitoring, evaluation, and analysis of health information. This infrastructure will be critical in resource allocation, addressing health inequities, preventing outbreaks and epidemics, and empowering patients to navigate the health system effectively.

Full Usage of Digital Health Information Systems with Trust and Security

The future emphasizes a fully digital HIS characterized by a high level of trust among users, and supported by stringent security measures for the storage and ethical use of patient data. This will enhance patient confidentiality, ensure data integrity, and build public trust in digital health systems.

Full Implementation of Universal Health Coverage (UHC)

The committee envisages fully implemented UHC, supported by highly functional province-wide and city-wide healthcare provider networks by 2058.. This will ensure that all individuals have access to the health services they need without financial hardship, facilitated by a well-connected network of providers and seamless information flow. These pulls aim to transform the HIS into a more connected, efficient, and patient-centered framework, ensuring that health care delivery is both high-quality and equitable across the Philippines.

Pushes of the Present

The pushes of the present that influence the future of HIS in the Philippines can be understood through several key existing factors and trends:

Legal Framework Implementation (DOH AO 2020-0016)

The full implementation of a legal framework to ensure that the design, implementation, and evaluation of public health programs (including HIS) are anchored in public health ethics. This provides a foundational push that ensures ethical standards guide all aspects of health data management and policy development.

Development of Policies and Guidelines

Several initiatives are currently in development or have been approved. These include the DOH Information Systems Strategy Plan, the Philippine Health Information Exchange, Health Information Management Systems in licensing requirements, and a Health Equity Roadmap. These policies and guidelines are crucial for standardizing and improving HIS across the country.

Inclusion in the Philippine Development Plan

The inclusion of advanced research and development, technology, and innovation in the Philippine Development Plan emphasizes the government's commitment to incorporating cutting-edge technologies and methodologies in health care and information management.

Use of Electronic Medical Records (EMR)

The existing use of EMR and the presence of disease-specific HIS represent a significant push, as they already provide a digital foundation that future expansions and integrations can build upon.

Devolution and the UHC Law

The implementation of the UHC Law, organized around province- and city-wide health systems, coupled with the Mandanas-Garcia Supreme Court ruling that increases the local government units' (LGUs) share of national revenues, pushes for more localized and integrated healthcare delivery systems.

Improvements in Internet Quality and Power Supply

Existing trends in internet quality and power supply, supported by incremental improvements as outlined in the WHO global strategy on digital health, facilitate the expansion and reliability of digital HIS.

Behavioral and Willingness Challenges

The limited behavior and willingness to use digital HIS due to concerns over the measures for usage and storage of patient data highlight the need for robust security and privacy policies to build trust among users.

Political Dynamics

The dynamic and often tumultuous political landscape, characterized by shifting alliances and agendas, can influence policy continuity and prioritization of health initiatives, affecting the stability and direction of HIS reforms.

Together, these pushes of the present shape the landscape within which the future HIS of the Philippines will evolve, highlighting the opportunities and challenges that need to be addressed to achieve the envisioned pulls of the future.

Weight of History

The weights of history that might impede the advancement of HIS in the Philippines by 2058 can be understood through several historical and systemic issues:

Conflicts Impacting HIS Implementation

Local, regional, and international conflicts can severely disrupt the implementation and transition towards interconnected, interoperable, and collaborative HIS. These conflicts can divert resources, focus, and political will away from necessary health infrastructure improvements.

Challenges Stemming from Devolution

The devolution process has led to significant variation in healthcare quality and interoperability between regions. This includes a lack of cooperation within the healthcare industry, resistance to change from healthcare providers, and a workforce that often lacks the necessary training in advanced HIS technologies. Furthermore, many areas suffer from inadequate IT infrastructure, technical issues, and poorly designed system architecture, which complicate the effective integration of eHealth technologies.

Financial and Administrative Barriers

Inadequate financing and uncoordinated ICT expenditures pose major challenges. Budgetary restrictions often limit the sustainability of projects, while administrative policies and a lack of visionary leadership fail to drive the necessary systemic changes for a robust HIS.

Political System Issues

The political environment in the Philippines is marked by a culture of political corruption and poor planning and implementation of programs. This results in frequent discontinuation and inconsistency in health programs, undermining long-term health strategies and the development of effective and sustainable HIS.

Inequitable Access to Internet and Digital Technology

Despite the growth boosted by internet and digital technologies, access remains poor and uneven across the Philippines. According to a 2022 Asian Development Bank report, many regions still lack the necessary digital infrastructure, which is crucial for the deployment and effective use of HIS. This digital divide limits the potential for UHC and equitable health service delivery.

These historical weights act as significant barriers to the progress and effectiveness of HIS in the Philippines. Addressing these challenges will require comprehensive policy reforms, strategic planning, and a commitment to overcoming these historical legacies to realize the envisioned future of an advanced, equitable HIS.

SCENARIO BUILDING

Business as usual

There is a significant divide among regions in terms of understanding and appreciating HIS, driven by differences in beliefs, culture, norms, and general literacy. This divide is further exacerbated by the prevalence of partisan politics, which often leads to the discontinuation of health programs. Despite ongoing efforts, the existing challenges in internet quality and power supply persist, with only slow and incremental improvements.

The continuous use of both paper and digital systems for managing, monitoring, and analyzing health information highlights the challenges in fully transitioning to digital solutions. Interestingly, more than 50% of Filipinos are keen on engaging in teleconsultations and telemedicine, indicating a growing acceptance of digital health services. However, despite the presence of cybersecurity training and legislative protocols, cases of hacking remain prevalent in various forms.

HIS are poorly interoperable due to differences in systems, nomenclature, coding, data dictionaries, connectivity, and open interagency accessibility. While there has been some progress in integrating HIS, differences in local capacities remain a challenge. The implementation of DOH AO 2020-0016 is often limited to procedural compliance, and data from HIS inconsistently provide evidence to support resource allocation and improvement in service delivery. Evidence to support equitable resource allocation and investments in health service delivery is based on aggregate data, and the analysis of health equity is not localized to municipalities and cities. The DOH oversees key surveillance systems, including Field Health Service Information System, Philippine Integrated Disease Surveillance and Response and National Enterovirus Surveillance System.

Preferred Future

Public health and technology infrastructure is comprehensive and forward-thinking. It includes the full enforcement of laws to ensure the continuity of government HIS initiatives across different administrations with proactive and timely conflict resolution. Recognition and respect of differences across cultures, ethnicities, and political groups is also a key aspect of the infrastructure. Major investments in internet infrastructure and sustainable energy sources, driven by government policies and public-private partnerships, are made and emphasized. Additionally, the necessary and crucial attention is allocated to developing and maintaining climate-resilient IT infrastructure that minimizes environmental impact while optimizing efficiency is crucial.

Improvements to cybersecurity protocols are another necessary element of a satisfactory infrastructure. These improvements include modernization with advanced zero trust architecture inclusive of tools and guidelines to prevent data breaches. Increasing the use of telemedicine to 100% among stakeholders, with a trust percentage of at least 90%, is a significant goal. It is essential to ensure that HIS are both interoperable and able to facilitate ethical data

sharing and collaboration. Establishing a highly integrated, decentralized HIS that promotes patient autonomy and empowerment is also highlighted.

Furthermore, using analytics to ensure no avoidable differences in health outcomes across different population groups, locations, and socioeconomic statuses is vital. Connecting surveillance systems and disease trend analysis with electronic medical records (EMR) is another key component. This vision emphasizes sustainability, equity, and technological advancement, aiming to create a more efficient and fair health system

Disowned Future

Political differences have led to the failure and abandonment of numerous HIS initiatives. Minimal progress is made in improving internet quality and power supply due to political instability, economic challenges, or poor governance. Additionally, there is a low budget allocation and prioritization for the research and development of IT infrastructure. The decline in telemedicine and teleconsultation users to less than 50% is concerning, coupled with the rising incidences of cybersecurity breaches in various government sectors. The evolution of hacking technologies and the absence of guidelines for data breaches exacerbate this issue.

There is a lack of competence in managing conflicts and differences among policymakers, HIS experts and users, causing more divide and misunderstanding across them. This negatively impacts the implementation, updating, and upgrading of HIS (HIS), as well as their use, and discourages open data sharing. Despite legal framework and policies, HIS remains highly fragmented and underdeveloped in many regions, with no unified national strategy for digital health. Ethical sharing of personal health information is not guaranteed by HIS, and health inequity persists despite the disaggregated data provided by these systems. Furthermore, surveillance systems are operating suboptimally, resulting in missed opportunities to prevent outbreaks and epidemics.

Integrated Future

Community-driven and public-private approaches drive improvements in internet quality and accessibility. Community-driven initiatives fill gaps in underserved areas, ensuring broader access. A HIS connected to primary health care networks is operational, but it remains largely fragmented. The continuation of government HIS requires public-private partnerships to complete and sustain.

Efforts to resolve conflicts (peace and order issues) remain ineffective and short-term due to lack of resources and competence, which impact on full implementation of HIS. Some regions experience delays in implementation, upgrading, and updating of HIS systems due to a lack of communication and understanding with the majority of the health facilities. However, updated cybersecurity protocols have increased the percentage of coverage in different fields related to health, with at least 70% of Filipinos aware of detecting data breaches when using digital health.

A collaborative health information ecosystem is emerging, leveraging shared data standards and technologies. Policies and procedures in public health ethics are widely disseminated but not consistently practiced or implemented. Capacity development to analyze and measure health inequities is being done, but LGUs are not using the findings to ensure no segment of the population is worse off. Surveillance systems are operational but not interconnected, highlighting the need for a more unified approach.

BACKCASTING THE PREFERRED FUTURE

Strategic Goal: Resilient and adaptive digital healthcare system

Horizon 1: 2047- 2058

Objective 1: Establish a resilient infrastructure for a digital healthcare system that ensures 99.9% uptime, supports secure data storage and transfer, and enables scalability to accommodate a 20% increase in user demand annually by 2058.

Specific Action 1: Utilization of renewable/alternative energy sources

The use of renewable energy sources provides several advantages on energy security and economic and local development in the country. One of its benefits include its sustainability if managed properly while ensuring protection of the environment from possible pollution. Moreover, use of alternative energy promotes economic development in rural and off-grid areas, thus benefiting even those communities in far flung areas. It also helps avoid the added costs when utilizing traditional energy sources due to fluctuations of fuel costs and foreign exchange (Delos Santos, undated). A study done by Agaton and Karl (2018), analyzed the sensitivity of investment decisions for use of renewable energy by factoring in the various electricity prices and addition of externality tax in consuming diesel. Their study concluded that shifting to renewable energy is a better option among developing countries, such as the Philippines, that are highly dependent on utilizing imported diesel products for electricity generation.

The enactment of landmark laws such as the Republic Act of 9367 (The Biofuels act of 2006) and R.A. 9513 (Renewable energy act of 2008) promotes the adaptation of renewable energy sources through fiscal and non-fiscal incentives.

Specific Action 2: Establishment of disaster-proof IT facility and equipment

The Philippines sits in the region called the pacific ring of fire that is susceptible to earthquakes and volcanic eruptions. Moreover, the country experiences an average of 20 tropical cyclones annually, all of which may pose catastrophic damage to humans and infrastructure. In fact, the country spent a total of 30 billion pesos in 2022 for damages incurred from natural disasters, mostly from typhoons (Retrieved from: <https://www.statista.com/topics/5845/natural-disasters-in-the-philippines-at-a-glance/#topicOverview> [February 15, 2025]).

In response, the government has allocated around 445 billion pesos to the climate change program with emphasis on disaster mitigation but very little on prevention (Retrieved from:

<https://www.statista.com/topics/5845/natural-disasters-in-the-philippines-at-a-glance/#topicOverview> [February 15, 2025]).

Based on the concept of creative destruction by economist Joseph Schumpeter, presence of losses after a natural calamity could help realize the need for improvement and replacement of outdated technologies with more advanced assets (Jha et al, 2018). By focusing on disaster preparedness through building calamity-resistant facilities and infrastructure could help lessen

the risk of losses and disruption of health service throughout the country especially in areas at highest vulnerability to natural calamities.

Specific Action: 3 Modernization of cybersecurity measures to protect socio-clinical information stored in the HIS

As of record, PhilHealth has experienced a devastating ransomware attack back in September 2023 compromising the health and personal information of its 13 million stakeholders. This breach endangered the release of private information of its client to possibility of identity theft and/or fraud. Such instances could be prevented by the adaptation of more resilient cybersecurity measures that could accommodate emerging innovations and combat unprecedented threats (Claro & Claro, 2024).

Included in the modernization are the establishment of robust security measures, increasing the number of cybersecurity experts, sustainable and funding and shift to the use of updated technologies.

Objective 2: Implement a data analytics framework that generates actionable, data-driven insights quarterly to inform at least three key policy updates and best practices annually, aimed at improving patient care outcomes and efficiency by 2058.

Specific Action 1: Continuous updating of bioinformatics tools for better correlational analysis

With the constant supply of information related to health and healthcare, there is a growing need for better technological advances that could help in the interpretation of medical data. The use of bioinformatics could shed newer light in the correlation of patient information with their health status thus providing novel insight for better patient management and guidance for the improvement of medical facilities and infrastructure.

Specific Action 2: Leverage private and public partnership to improve access of digitalized personal bio data from wearables/gadgets

Public-private partnerships have been shown to benefit the health sector by providing opportunities for investment to private companies while ensuring health services are provided with the highest quality to intended clients with little upfront investment from the government. Other advantages of PPP include the provision for updating technologies and infrastructure (including equipment), and higher opportunities for training personnel (Rao, 2019).

Strategic Goal: Functional, adaptive and resilient healthcare digital system

Horizon 2: 2031 - 2046

Objective 1: Implement a comprehensive capacity-building program in digital healthcare that trains at least 80% of healthcare staff in essential digital skills, hosts quarterly workshops on emerging technologies, and establishes a mentorship system to support continuous learning and skill advancement by 2046.

Specific Action 1: Provide quality incentives/grants to resource personnel working on STEM and related sciences

There is available evidence showing the correlation of providing incentives (monetary or other types) to performance and productivity among workers. As an example, meta-analysis done by Condly et al (2003), showed that monetary incentives increased employee productivity by 22%.

Provision for monetary incentives has been used in other countries to encourage recruitment of eligible students/employees to STEM. However, the use of incentives must not only ensure higher recruitment rates but should also consider the retainment of talented individuals to STEM. Analysis of the SMART initiative being employed in the United States of America resulted to:

Specific Action 2: Widespread health information drive to increase positive behavior towards use of digital technologies related to health

Specific Action 3: Nationwide training and re-training of personnel on their readiness to digital health platforms and softwares

Specific Action 4: Community-wide training of end-users to increase utilization and increase navigational skills on digital health applications

Strategic Goal: Integrated health information systems

Horizon 3: 2025 - 2030

Objective 1: Establish standardized health data and privacy regulations that ensure compliance across 100% of healthcare facilities, including clear protocols for data access, storage, and sharing, and conduct annual audits to ensure ongoing adherence and protect patient privacy by 2030.

Specific Action 1: Establish a national health committee on digital health standards that govern the use , sharing, and regulation of health data across institutions

Specific Action 2: Develop policies that will support standardization of health data and privacy regulations.

Objective 2: Develop an integrated cloud-based health data network that enables secure, real-time sharing of patient data between public and private healthcare providers, ensuring compliance with data privacy standards and improving coordination of patient care across facilities by 2030.

Specific Action 1: Develop a nationwide, interoperable EHR system that will connect govt and private health care facilities

Specific Action 2: Ensure nationwide broadband internet access, esp in rural areas to support data exchange

Specific Action 3: Mandate budget allocation specific for digital healthcare system

Specific Action 4: Introduce digital health competency in the curriculum of medical training school to ensure that healthcare professionals are equipped to use digital health tools

ROADMAP OF THE HEALTH INFORMATION SYSTEMS IN THE PHILIPPINES BY 2058

The HIS (HIS) Technical Roadmap for the Philippines by 2058 outlines a strategic and progressive approach to achieving a fully integrated, resilient, and technologically advanced healthcare system. With the increasing demand for real-time patient data, digital literacy among healthcare professionals, and cybersecurity in medical infrastructures, this roadmap provides a clear pathway for transformation.

Beginning in 2025, challenges related to real-time patient data access pose a significant barrier to effective medical decision-making across healthcare settings. By 2025 to 2030, the focus shifts to achieving an integrated HIS by establishing standardized health data and privacy regulations, developing a cloud-based health data network, and leveraging AI-driven adaptive learning for personalized digital health education. From 2031 to 2046, efforts will concentrate on digitally proficient healthcare workers, integrating digital literacy into health curricula, implementing national policies that promote digital literacy, and incorporating digital health solutions into clinical practice. In the final phase, from 2047 to 2058, the goal is to build a resilient infrastructure for a unified digital healthcare system through the effective use of renewable energy, the establishment of climate-resilient digital infrastructure, and the enhancement of security systems and cyber resilience.

This roadmap serves as a visionary guide for stakeholders in the healthcare and technology sectors, ensuring that by 2058, the Philippines will have an advanced, secure, and efficient HIS capable of meeting the evolving needs of its population.

The graphical summary of the roadmap of the HIS in the Philippines by 2058 is shown in Figure 1.2.

Health Information Systems (HIS) in the Philippines by 2058

Technical Roadmap

2047-2058 RESILIENT INFRASTRUCTURE FOR A UNIFIED DIGITAL HEALTHCARE SYSTEM



Effective utilization of renewable energy source
Establish climate resilience digital infrastructure
Enhance security system and cyber resilience

2031-2046 DIGITALLY PROFICIENT HEALTH CARE WORKERS



Integrate digital health literacy in the health curricula
Develop national policies promoting digital literacy
Integrate digital health solutions to clinical practice

2025 - 2030 ACHIEVE INTEGRATED HIS



Establish standardized health data and privacy regulations
Develop an integrated cloud-based health data network
Utilize AI-driven adaptive learning to personalize digital health education

2025 CHALLENGES WITH HIS INTEGRATION



Access to comprehensive, real-time patient data remains a critical issue that hinders effective medical decision-making across various healthcare settings

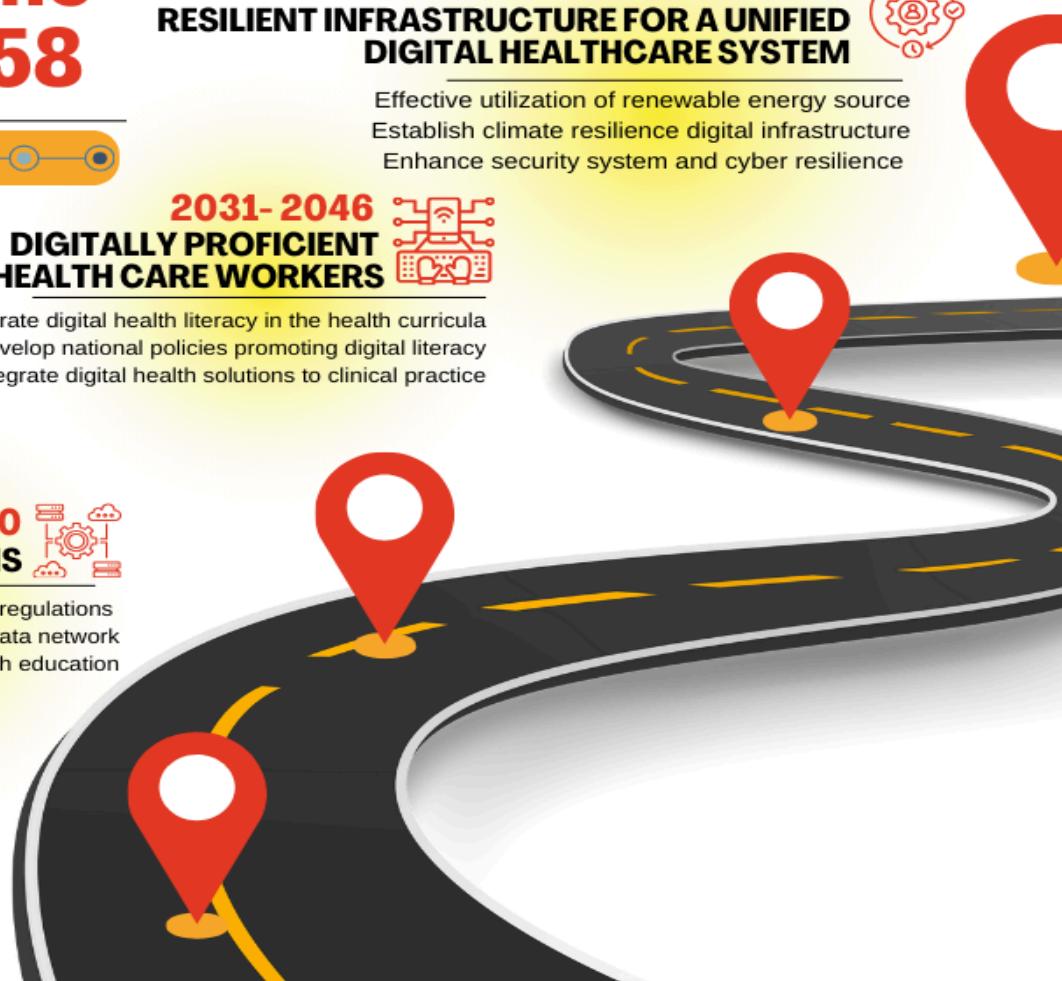


Figure 1.2. Roadmap of the HIS in the Philippines by 2058.

SECTION 2

THE FUTURES OF HEALTH PROFESSIONS EDUCATION DELIVERY IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058

Contributors:

Asst. Prof. Jan Vincent T. Delos Santos

College of Nursing

Dr. John Erick B. Quiniquini

College of Dentistry

Asst. Prof. Laurence Lloyd B. Parial

College of Nursing

Ms. Niña F. Yanilla

National Teacher Training Center for the Health Professions

Assoc. Prof. Raymond Fernando B. Yu

College of Pharmacy

INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE

Futures thinking and foresight involve the utilization of indispensable tools and approaches for recognizing emerging issues, navigating uncertainties, building possible scenarios, and sharing a common vision to achieve a preferred future (Asian Development Bank, 2020). Notably, intersectoral collaboration, innovation, and sustainable systems and strategies are crucial towards achieving future-proof organizations.

The following section reports the collaborative output of Group 2 of the University Futures Masterclass held last September 9 to 11 at Manila, Philippines. The focus of the report is on the *Futures of Health Professions Education Delivery in the University of the Philippines Manila by 2058*. Utilizing the tools of futures thinking and foresight, the sections included in this report are the following: (1) Description of the Focal Issue; (2) Causal-layered Analysis; (3) Environmental Scanning; (4) Futures Triangle; (5) Scenario Building; (6) Back-casting and Roadmapping towards the Preferred Future.

The Futures of Health Professions Education Delivery in UP Manila by 2058

The recent COVID pandemic, coupled with unstable environmental and geopolitical conditions highlighted important considerations regarding the delivery of tertiary education in the country. It was made apparent that teaching and learning strategies as there are currently practiced were not disaster- or future-proof. Moreover, health professions education (HPed) is continuously influenced by the increasing demands of globalization, technology, and lifelong learning. As the premier university in the Philippines in HPed, it is imperative for UP Manila to be responsive to the emerging and future demands of education. No one should be left behind towards such a goal, and UP Manila should create futures where learning systems are self-directed, technologically-driven, and resilient. The time horizon for this focal issue is the year **2058**, where the University will be celebrating its 150th founding anniversary.

Various stakeholders are involved in this focal issue. First, the following **persons or entities share decision-making roles** in the futures of HPed delivery:

- a. *National government*: As the national university, UP is highly dependent on government funding and regulations. Hence, the university's capacity to fully integrate technologically-driven self-directed learning could be influenced by the fiscal policies and state priorities.
- b. *Local government*: Since UP Manila is under the local government unit of the Philippines' capital city, the LGU's decisions in the conduct (or non-conduct) of classes influence the institution's HPed delivery.
- c. *UP System*: The Board of Regents have crucial roles in steering the direction of the whole UP system. Hence, they also have decision-making roles in the futures of HPed delivery in UP Manila.

- d. *UP Manila administration and offices*: The Chancellor's management team, together with the administrative offices of the university are the key drivers to propose, implement, and evaluate the HPED delivery across the units and programs.
- e. *College administration*: Individual colleges and units within the university have different programs/courses, which may require tailored delivery approaches to ensure achievement of desired learner outcomes.

Meanwhile, the following **persons or entities might be affected** by the identified focal issue:

- a. *Students*: They are the primary stakeholders affected by HPED delivery in UP Manila. Their competencies could be influenced by the methods/strategies in use to train future healthcare professionals.
- b. *Faculty*: As the primary implementers of HPED, the faculty needs to be trained and supported in the delivery of quality HPED. They must be made cognizant of the evolving needs and competencies of the learners and the healthcare system at large.
- c. *REPS and administration staff*: As partners in ensuring quality delivery of HPED across units, REPS and administration staff must also be capacitated to assist the faculty/students in advanced and emerging learning strategies.
- d. *UPM/College administration*: While the administration has crucial decision-making roles in the HPED delivery within the University, they are also affected by its implementation, because due to policy adjustments, there will be added pressure on the administration to be adaptable to the changing needs of stakeholders.

The following **sustainable development goals (SDGs)** (United Nations, 2015) are covered by this focal issue:

- a. **SDG 3**: Ensure healthy lives and promote well-being for all at all ages
 - i. High quality and future-proof HPED delivery will better equip the health workforce, which in turn translates to consistent outcomes.
- b. **SDG 4**: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
 - i. Technologically-driven and self-directed learning that promotes quality training of future HCPs should be accessible to all students, regardless of social status.
- c. **SDG 9**: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
 - i. For learning to be technologically-driven and globally-competitive, physical and digital infrastructures would require sustainable advancements and innovation.
- d. **SDG 10**: Reduce inequality within and among countries
 - i. Integrating self-directed learning that is complemented by advanced teaching technologies across higher education institutions (HEIs) in the country is a

significant step to improving the quality of education and competencies of graduates who will serve the local and global population.

Significance of the Focal Issue

Various external factors continuously present both threats to and opportunities for change in the quality of HPED in the country. This is a crucial consideration for a resilient and responsive health system. For instance, the climate change-related events in the Philippines, such as inclement weather conditions, flooding, and heat waves, have persistently affected the quality of teaching and learning across all age groups (Department of Education, 2021; United Nations, 2024). Manila is considered one of the sinking megacities in Southeast Asia (UP Resilience Institute, 2022), and the flooding in Taft Avenue every after moderate to heavy rain shower is a persistent reminder that the physical location of UP Manila may not be future-proof. Meanwhile, the three-year experience of the Philippines from the COVID-19 pandemic has provided numerous lessons among educational institutions regarding the importance of alternative modes of learning, such as digital and self-directed methodologies. Additionally, the geopolitical tensions in the Indo-Pacific region, could also lead to uncertainties to the delivery of HPED within the country. Amidst these threats, HPED should be both disaster-proof and future-proof, i.e. education and training of future HCPs can be facilitated despite interruptions brought about by health emergencies/disasters.

Meanwhile, the constantly evolving landscape of HPED demands institutions to adapt to ensure global competitiveness among their graduates. Various developments in HPED include the utilization of immersive technologies, such as virtual reality, augmented reality, mixed reality, and high-fidelity simulation (Li, 2024). In healthcare, mobile apps and telehealth have increased utilization among key stakeholders to promote a more universal and inclusive access. Finally, it is vital to explore and determine the utilities and potential applications of AI in HPED, clinical decision-making, and learning outcomes (Feigerlova et al., 2025) in molding qualified HCPs. As the National Health Sciences Center, UP Manila should initiate efforts for future-proofing of HCP education that is globally-competitive, technologically-driven, and flexible/self-directed.

In line with the futures of HPED delivery, the following **questions** need to be further **explored**:

1. Given the nature of HPED offered by UP Manila, what modes of learning in classes and clinical settings can be developed/implemented towards being technologically-driven and self-directed?
2. Apart from online learning, what other emerging technologies can be utilized for HPED?
3. What are evidence-based and successful remote teaching-learning strategies that would promote self-directed learning?
4. Where (and how) can UP Manila seek guidance/support to develop and integrate technologically-driven self-directed learning in HPED?

5. What resources (physical, technological, human, financial) are required/crucial to support the university stakeholders to promote technologically-driven self-directed learning for HPED?
6. How can the university promote readiness of teachers and learners towards alternative and advanced modes of teaching HPED?
7. How can the university ensure that the standards and quality criteria of HPED are not sacrificed when compared to the traditional mode of delivery of skill-based courses?
8. How can the university ensure that technologically-driven and self-directed learning can achieve the desired clinical skills and competencies of HPED graduates, as compared to the traditional/existing methods?

CAUSAL LAYERED ANALYSIS

Causal Layered Analysis (CLA) is a foresight approach and technique developed by Sohail Inayatullah in the late 1980s to identify four levels of analysis in creating coherent new futures. Inayatullah (2019) describes this approach as a way to understand the point of view of different stakeholders, analyzing different perspectives on issues and scenarios. It creates transformative spaces for creating alternative futures.

Litany or Problem

The first level, or the litany, presents the official description of the problem and the unquestioned future, which is uncontested and unchallenged because it is construed as reality. It explores an externalized reality, like a newspaper headline, which is often disconnected to other perspectives (Inayatullah, 2019).

In the current CLA, as of 2024, a reality experienced is the *disruption of classes and clinicals due to suspensions* brought by climate change-related events, such as inclement weather conditions, flooding, and heat waves. Because of these disruptions, *baseline competencies* expected of students *are not met*, given the *current methods of delivery of remote learning*. For instance, due to inclement weather conditions, the streets surrounding UP Manila are flooded and face-to-face classes are suspended. Education delivery shifts to synchronous or asynchronous methods, such as Zoom classes or virtual learning environment activities. With these, the expected competencies are challenged, more so with degree programs and courses that necessitate learning to be delivered face-to-face, such as in-person laboratories and patient care. In addition, *all stakeholders are not equipped for remote learning*. Teaching-learning activities are designed to be delivered in person. Resources, such as stable internet connection and available technological devices, remain a challenge. Students and faculty are not adequately capacitated to not only shift the delivery of education to online or remote learning methods but also to embed these, whether there will be suspensions or not. Furthermore, *colleges are in silos*. Since each college has their particular course outcomes and needs, the ways to deal with the problem of class disruption are also limited to what each college can do. Colleges work on their own, finding possible alternatives just to ensure that learning could still be achieved and not be totally compromised.

On the other hand, for the transformed CLA, by 2058, the reality shall be characterized by *learning that is self directed and complemented with advanced teaching-learning technologies*. This kind of learning shall be *integrated in all course instruction across all programs of UPM*. In contrast with the current CLA, by 2058, students and faculty have integrated technologies that will enable them to deliver education that is self directed, without having the problem of disruption and unmet competencies. With this reality in place, *learning is uninterrupted and resilient to external events*, such as *public health problems, disasters, suspensions*. Unlike the inclement weather conditions, flooding, and heat waves that disrupt learning, education by 2058 is resilient to climate change-related events and disasters. More so, in contrast with that of the current CLA, *all stakeholders are sufficiently capacitated and*

empowered to adapt to advanced teaching-learning technologies. This means that adequate training and capacity building activities shall be in place to ensure that stakeholders are empowered to utilize and integrate technologies into teaching and learning. With this, *graduates of the university are world-class but culturally responsive to the needs of the Filipino society.* UPM graduates are true to their identity of service, especially to the needs of Filipino communities. Moreover, *interprofessional education and collaboration is fully embedded and practiced in the course development delivery.* Recognizing the importance of working together, colleges and professions integrate collaborating with each other, even within the delivery of their courses. And to achieve all these, there shall be *adequate funding to facilitate advanced teaching-learning technologies in HPED.*

System

The second level, or the social / systemic causes, presents the systemic perspective, which may include the social, technological, economic, political, and environmental levels. According to Inayatullah (2019), this level explains, questions, maps, and analyzes the data and historical variables of the litany, usually through a short term analysis, like policy reports.

In the current CLA, as of 2024, analyzing the political levels of the litany, education is driven by *national / LGU policies on class delivery during disasters / typhoons.* Every time a climate change-related event occurs, such as inclement weather, typhoon signals, incidence of flooding, and high heat index, the national government and the local government—in UPM's case, the City of Manila—announces the suspension of classes and/or shifting to alternative means, such as online or remote learning. There are also *University policies on class suspensions,* such as announcements from the Chancellor to suspend classes in times of flooding or shifting to alternative modes of learning, such as with high heat index. Given these circumstances, *bureaucratic processes are not streamlined.* Orderliness and appropriateness of instruction may be compromised. More so, *the budget for remote learning is difficult to access* and *internal infrastructure is lacking,* as courses are in reality, designed to be delivered face-to-face, thus shifts to remote learning are not anticipated and may not be part of the original plan. Furthermore, there is a lack of *training for all stakeholders on conducting / performing remote learning.* Students and faculty are not capacitated to deliver education through means, given the nature of instruction, such as laboratories and clinical duties, that has to be delivered in person.

On the other hand, for the transformed CLA, by 2058, *local and institutional DRRM policies for SUCs are institutionalized and fully implemented.* In contrast with the current CLA, educational institutions like UPM shall be equipped with implemented policies, ensuring that actions with regard to disasters are timely and appropriate. This constitutes *provision of flexible learning options among institutions during public health problems / disasters,* highlighting that learning has already been not limited to the conventional teaching-learning activities in place. To achieve these, there is *adequate funding for education, such as for training of trainers, provision of appropriate equipment and learning management system.* Education has become a priority such that capacity building and training are already implemented and the necessary

resources are adequately received and utilized by students and faculty. With this, there shall be *adoption of self-directed learning strategies across courses, independent of the external situation*. Thus, learners have become empowered to take charge of their learning and not fully dependent on external events nor administrative announcements, such as during climate change-related events that prompt suspension and disruption.

Worldview

The third level, or the discourse analysis which supports the worldview, presents the unpacking and discerning of ideological and discursive assumptions that may be deeper and are unconsciously held behind the problem. It also explores the ways the litany and the system are constructed by different stakeholders, thus making it important to critically understand the issues from multiple worldviews. In particular, these worldviews have developed over time and are deeply held and often non-negotiable perspectives on how things are, on the nature of reality (Inayatullah, 2019).

In the current CLA, as of 2024, a developed worldview is *Pwede na / Puro na lang resilience*. People have been accustomed to perceiving that the responses of educational institutions to the current climate change-related events are already acceptable. *Pwede na*, given the limited resources and capacities. *Pwede na*, given the lack of prioritizing and planning. And these are attributed to just reasoning out that Filipinos are by nature resilient, that given the numerous natural and man-made events the country has experienced, its people have grown to be adaptive and resilient to calamities and disasters. Deeply held and often non-negotiable, this worldview has been unconsciously assumed, affecting the way policies are developed and alternative solutions are explored.

On the other hand, for the transformed CLA, by 2058, the worldview shall be *Hindi pwede ang pwede na*. Having critically understood the issues, educational institutions such as UPM have transcended what has been regarded as accepted or acceptable. With the necessary focusing and capacitating of its critical stakeholders, Filipino educational institutions such as UPM have looked beyond what they have long welcomed as fine or appropriate. Instead, by 2058, they shall have challenged the system and not accept what has been perceived as mere acceptable.

Myth or Metaphor

The fourth level, or the myth / metaphor linked to culture and long-term history, presents the unconscious emotive dimensions of the issue. Inayatullah (2019) describes that this level presents deep and more difficult to access stories that require inner transformation, as it explores how solutions may emerge from new narratives.

In the current CLA, as of 2024, the unconscious emotive dimension of the issue perceives *Malayo pa ang umaga*. The better futures and situations we deserve are far from what is being experienced by many at present. If educational institutions are currently in darkness or in dim

because of their ill responses to climate change-related events, the light or clarity that we need is miles away. Having perceived that hope is distant, the actions and solutions in place, such as of critical stakeholders and governing institutions, have remained to be bare minimum. Educational institutions have not planned for nor created better futures, confined in the darkness of the night and accepting that the hope of the morning is not a reality close to that of today.

On the other hand, for the transformed CLA, by 2058, the myth / metaphor shall be *Morning has broken*. Living in futures full of freshness and hope, educational institutions such as UPM have achieved the morning they have long dreamed and waited for. They have long passed the darkness of the night and have now embraced the reality full of clarity and ability. The future of health professions education delivery has become a beautiful and hope-filled reality. The Figure 2.1 in the next page summarizes these four levels of analysis.

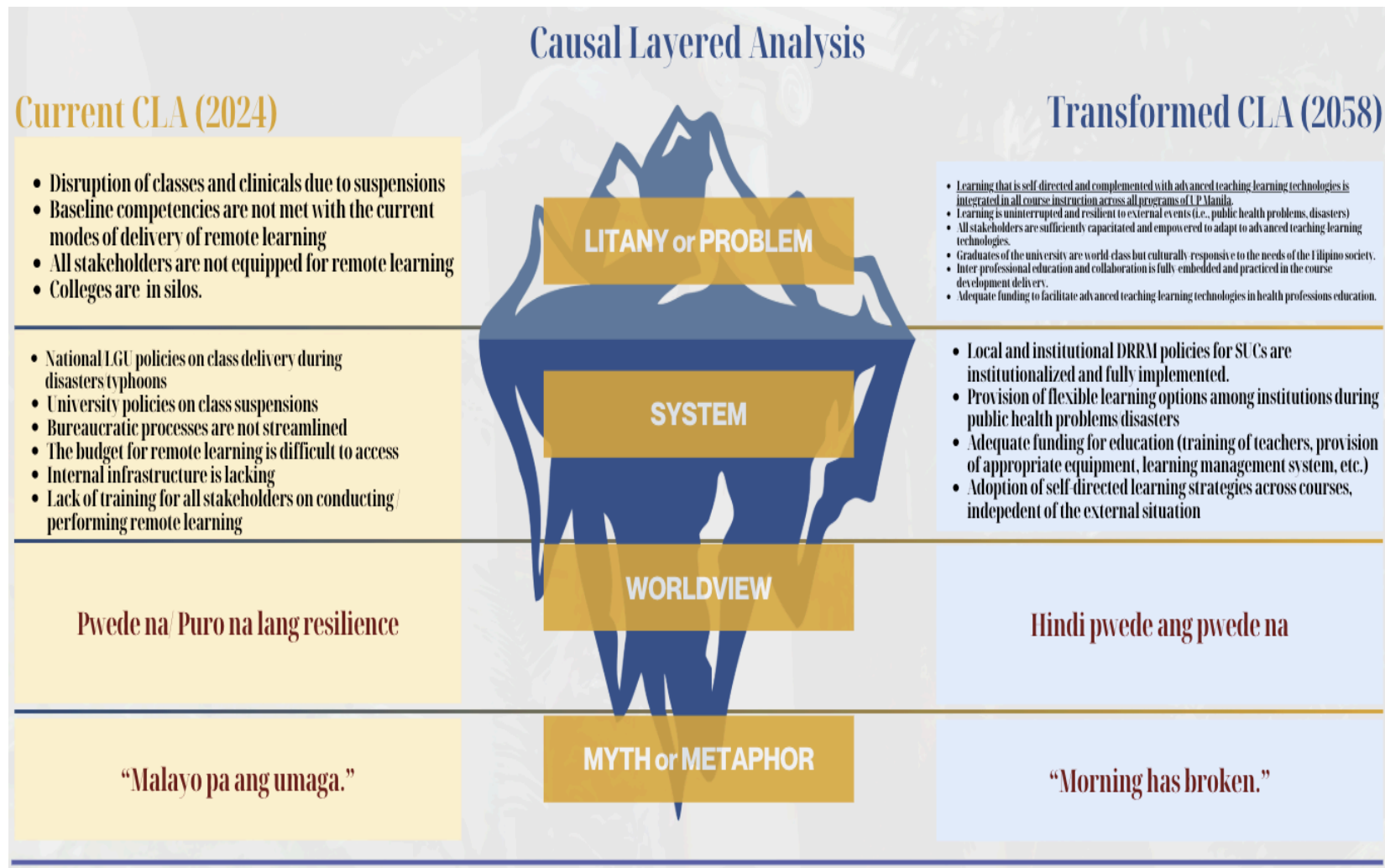


Figure 2.1. Causal-layered analysis of the Futures of Health Professions Education Delivery in UP Manila by 2058

ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK

Environmental scanning, as part of the mapping process, focuses on collecting information on megatrends, trends, driving forces, and emerging issues about the focal issue. In this report, the focal issue is that tertiary education may not be disaster- or future-proof. Our group conducted this environmental scanning to explore how the futures of health professions education delivery in the University of the Philippines Manila would be disaster- or future-proof by 2058.

There were different frameworks used in environmental scanning, namely: PESTLE, STEEP, STEBNPDILE, INSPECT++, and STEEP. For this report, we made use of the STEEP framework to identify the patterns of change in health professions education delivery and we categorized them into opportunities and threats. According to Kedge (2019), there are 3 environments of foresight. One macro, the meta and the micro. The macro is also known as the external environment, which includes the external driving forces and the meta refers to the industry environment, which includes the internal driving forces i.e., regulations, competitors, and stakeholders i.e., administrators, faculty, REPS, administrative staff, and students. The macro or external environment is the focus of this part of the report, scanned using the STEEP framework.

Social Factors

Opportunities

Social factors encompass demographic trends, cultural attitudes, lifestyle changes, population demographics, and societal values that can influence consumer behavior and market demand. Preference towards flexible learning using Zoom and Canvas is also included. Our group also recognized that the culture of acquiring information immediately through various sources and digital savvy in use of social media in the younger generation can be leveraged towards learning.

Threats

Threats under the social factors include the students' culture of dependence on teachers and the culture among teachers that they always know better (asserting authority in the learning environment). Seasoned generations also have resistance to change as well as to technology-mediated learning modalities. With the onset of AI and technology, ethical considerations in their misuse should also be addressed. In addition to this, the human dimension in learning has been found lacking. Aside from all these, the threats also include the lack of culture sensitivity and gender sensitivity among stakeholders.

Technological factors

Opportunities

With the internet, the acquisition of knowledge becomes easier. There are available hard and soft infrastructure (e.g., gadgets, virtual/augmented reality, AI) and several online tools (i.e., LMS like Canvas, Google Classroom; Apps like Labster, Mentimeter, Slido, Kahoot) that can be used to complement learning.

Threats

It has been recognized that there is still inaccessibility of technologies (internet connection, device, etc.) and limited data storage among users that may either be due to financial or geographical reasons. Although technology, if used effectively, can facilitate learning, it can still be limited in achieving intended competencies, especially those which need actual human interaction. Moreover, if digital technologies, like AI, are misused, it could also defeat the purpose of learning.

Poor digital literacy among teachers and students is still evident like inability to effectively access, understand, appraise, and utilize online information and inability to cope with the complex navigation of digital technologies or innovations.

Environmental factors

Opportunities

Improving mobile network connectivity among some areas in the country would enable online learning. Self-directed learning has a potentially lower carbon footprint.

Threats

The Philippines is part of the Pacific Ring of Fire system. This makes us vulnerable to volcanic eruptions and earthquakes, which could potentially cause learning disruption. Climate change altered weather patterns causing intense heat or rains during unusual times of the year as well as man-made disasters can cause learning disruption. Included as an environmental threat is the fact that distance/location of learners that does not support Internet connectivity can also be a factor.

Economic factors

Opportunities

Increasing financial accessibility to various data plans and mobile gadgets can democratise learning. There are also cost-saving advantages of having digital medium over physical forms such as cloud storage over physical materials and space. Funding opportunities offered by UP Admin, CHED, and other agencies for proposals for innovations/infrastructures

are beneficial as well.

Threats

Economic threats include the cost of connectivity, which could be a hindrance to joining online classes and the cost of innovating the infrastructural materials for the university.

Political factors

Opportunities

Politicians have the power to support, influence, fund self-directed learning initiatives. Currently, more budget is allocated as online/remote learning becomes more promoted as the mainstream mode of learning.

Threats

Unfortunately, education is not a top priority of the current administration. There seems to be a wishy-washy decision making regarding class suspensions. There is no clear political jurisdiction, when it comes to making decisions regarding the conduct or suspension of classes.

Key Factor Identification

All the identified social, technological, environmental, economic, and political factors above were assessed according the following criteria: (a) *Impact/potential magnitude of the factor's effect* on a scale of 1- lowest to 5 - highest; (b) *Degree of uncertainty* using the scale of 1- lowest to 5 - highest; (c) *Relevance* using the scale of 1- lowest to 5 - highest; and (d) *Controllability/extent to which the organization can influence the factor* using the scale from 5 0 lowest to 1 - highest (See Tables 2.1–2.5).

In Table 2.1, the social factors have an overall mean rating of 13.3 with the total scores ranging from 11-16. Both the impact and relevance of these factors have a mean rating of 4.1 which is relatively higher compared to the ratings of uncertainty (2.6) and controllability (2.5). Table 2.2 shows the technological factors with the overall mean rating of 15 ranging from 10-18 with the limited data storage having the lowest overall score. Unlike in the social factors, the mean ratings across all 4 criteria are relatively high at ≥ 3 . The environmental factors in Table 2.3 have the highest overall mean rating of 17.3 ranging from 15-20. The highest rating of 20 was given to climate change, disasters, and vulnerability to volcanic eruptions and earthquakes with a score of 5 across all 4 criteria of impact, degree of uncertainty, relevance and controllability.

Table 2.1. Social Factors

Social Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Preference towards flexible learning	5	2	5	2	14
Culture of acquiring information immediately	5	2	5	3	15

through various sources					
Digital savviness among the young	5	1	5	5	16
Culture among students of dependence on teachers	4	2	3	2	11
Culture among teachers that they always know better (authority in the learning environment)	4	2	3	2	11
Resistance to change among older generations of teachers	3	3	3	2	11
Resistance to technology-mediated learning modalities	4	3	4	2	13
Ethical considerations of misuse of AI in learning	4	4	5	2	15
Lacking human dimension in learning	3	4	4	2	13
Lack of culture-sensitivity and gender-sensitivity	4	3	4	3	14
Mean Ratings	4.1	2.6	4.1	2.5	13.3

Index: 0 - lowest score, 5 - highest score

Table 2.2. Technological Factors

Technological Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Internet which can ease acquisition of knowledge	5	1	5	4	15
There are several online tools that can be used to complement learning	4	3	4	4	15
There are available hard and soft infrastructure (e.g., gadgets, virtual/augmented reality, AI) that can be used to complement learning	5	2	4	3	14
Inaccessibility of technologies (internet connection, device) to users, either financially or geographically	4	4	5	4	17
Inability of technologies to achieve intended competencies (such as actual human interaction)	4	4	5	3	16
Poor digital literacy among teachers and students (inability to effectively access, understand, appraise, and utilize online information complex navigation of digital technologies or innovations/skills matching)	4	4	5	2	15
Misuse of digital technologies such as AI could defeat the purpose of learning	5	4	5	4	18
Limited data storage	3	2	3	2	10
Mean Ratings	4.3	3.0	4.5	3.3	15.0

Index: 0 - lowest score, 5 - highest score

Table 2.3. Environmental Factors

Environmental Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Improving networks among some areas in the country	3	4	3	5	15
Self-directed learning has a potentially lower carbon footprint	5	1	5	1	12
Climate change altered weather patterns causing intense what or rains during unusual times of the year	5	5	5	5	20
The Philippine is part of the Pacific Ring of Fire system, which makes us vulnerable to volcanic eruptions and earthquakes	5	5	5	5	20
Faulty road infrastructure and flooding system	5	3	4	4	16
Disasters that can disrupt internet connectivity	5	5	5	5	20
Distance/Location that does not support internet connectivity	5	3	5	5	18
Mean Ratings	4.7	3.7	4.6	4.3	17.3

Index: 0 - lowest score, 5 - highest score

Meanwhile, the economic factors had the lowest overall mean rating of 13.2 with total scores ranging from 11-16. The lowest rating of 11 is both given to the cost and funding of innovation in infrastructure (See Table 2.4). The political factors in Table 2.5 got the second to the highest overall mean rating of 16.4 with scores ranging from 15-17. Its mean scores across all 4 criterias ranged from 3.2 - 5.

Table 2.4. Economic Factors

Economic Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Increasing financial accessibility to various data plans	5	1	5	2	13
Increasing financial accessibility to purchase mobile gadgets	5	1	5	5	16
Cost saving advantages of digital medium over physical forms (cloud storage over physical materials and space)	4	1	4	3	12
Funding for proposals for innovation/infrastructures	3	3	4	1	11
Cost of connectivity	5	1	5	5	16
Cost of innovating the infrastructure	4	1	5	1	11

Mean Ratings	4.3	1.3	4.7	2.8	13.2
---------------------	------------	------------	------------	------------	-------------

Index: 0 - lowest score, 5 - highest score

Table 2.5. Political Factors

Political Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Politicians have the power to support, influence, fund self-directed learning initiatives	5	3	5	3	16
More budget is allocated as online/remote learning becomes more promoted as the mainstream mode of learning	5	3	5	2	15
Wishy-washy decision-making regarding class suspensions	5	4	4	4	17
Education is not a top priority of the current administration	5	3	5	4	17
Political jurisdiction/decision-making regarding conduct of classes (might be same as factor 2)	5	3	4	4	17
Mean Ratings	5.0	3.2	4.6	3.4	16.4

Index: 0 - lowest score, 5 - highest score

Arranging all factors according to their overall mean ratings, the top key factors are: environmental (17.3), political (16.4), technological (15), social (13.3), and economic (13.2). Based on these assessments of key factors, the proposed disaster- and future-proof health professions education delivery should prioritize the impact, relevance, and degree of uncertainty of the environmental, political and technological factors. Unfortunately, all 3 have relatively low controllability. Table 2.6 lists the top 10 key STEEP factors that need to be prioritized. The group decided to pick the top 2 across all the factors with the highest overall scores. They include digital savviness, inaccessibility of advanced technologies, unstable environmental conditions, cost of innovation/technology, and non-prioritization of education in the country.

Table 2.6. Top 10 Key STEEP Factors

STEEP Factors	Impact	Uncertainty	Relevance	Controllability	Total Score
Digital savviness among the young, particularly with evolving technologies (AI, robotics) [SOCIAL]	5	1	5	5	16
Culture of acquiring information immediately in various sources (not everything is in the books, knowledge may be 'instant') [SOCIAL]	5	2	5	3	15
Inaccessibility of advanced technologies to target users [TECHNOLOGICAL]	4	4	5	4	17
Misuse of digital technologies such as AI could defeat the purpose of learning	5	4	5	4	18

[TECHNOLOGICAL]					
The Philippines (particularly Manila) has unstable environmental conditions (flooding, earthquake) [ENVIRONMENTAL]	5	5	5	5	20
Disasters that can disrupt distance/alternative learning [ENVIRONMENTAL]	5	5	5	5	20
Increasing financial accessibility to obtain devices/connectivity [ECONOMIC]	5	1	5	5	16
Cost of innovation/technology [ECONOMIC]	5	1	5	5	16
Education is not a top priority or the current and previous administration [POLITICAL]	5	3	5	4	17
Political jurisdiction/decision-making regarding conduct of classes	5	3	4	4	17
Index: 0 - lowest score, 5 - highest score					

IDENTIFYING PLAUSIBLE FUTURES THROUGH THE FUTURES TRIANGLE

The Futures Triangle is a method that maps three competing factors: (1) the pulls of the future, (2) the pushes of the present, and (3) the weights of history (Inayatullah, 2023). By identifying the competing aspects of the past and present, this method can be utilized to plot the preferred future. The Futures Triangle of HPed delivery in UP Manila by 2058 is shown in Figure 2.2 found in the following page.

PULLS OF THE FUTURE

- **Learning that is self-directed and complemented with advanced teaching-learning technologies is integrated in all course instruction across all programs of UPM.**
- Learning is uninterrupted and resilient to external events (i.e., public health problems, disasters, suspensions)
- All stakeholders are sufficiently capacitated and empowered to adapt to advanced teaching-learning technologies.
- Graduates of the university are world-class but culturally-responsive to the needs of the Filipino society.
- Inter-professional education and collaboration is fully-embedded and practiced in the course development/delivery.
- Adequate funding to facilitate advanced teaching-learning technologies in health professions education.

PUSHES OF THE PRESENT

- The rise of AI and other technologies, coupled with digital literacy demand
- Paradigm shift to student-centered, outcomes-based, interprofessional and collaborative education
- Globalization of healthcare professions
- Disasters and unstable environmental conditions (lessons from the COVID-19 pandemic)
- Governance problems (political will, decision making in conduct of classes)
- Evolving mindset of social and cultural inclusivity



WEIGHT OF HISTORY

- Essential institutions and stakeholders are not fully capacitated and equipped to be abreast of remote learning strategies; thereby leaving them to make strategies of their own.
- Current remote learning strategies do not deliver the desired hard skills and competencies expected of each course programs.
- Professional licensure examinations mostly focus on knowledge-based competencies
- Learning is oftentimes hampered due to internal and external factors i.e., suspension of classes, natural calamities, disasters, national holidays, etc.
- Teacher-centeredness model

Figure 2.2. Futures Triangle of Health Professions Education Delivery in UP Manila by 2058

Pulls of the Future: How do we want the desired futures of HPed to look like?

The desired future of HPed has the following elements:

- a. Learning that is self-directed and complemented with advanced teaching-learning technologies is integrated in all course instruction across all programs of UPM.
- b. Learning is uninterrupted and resilient to external events (i.e., public health problems, disasters, suspensions)
- c. All stakeholders are sufficiently capacitated and empowered to adapt to advanced teaching-learning technologies.
- d. Graduates of the university are world-class but culturally-responsive to the needs of the Filipino society.
- e. Inter-professional education and collaboration is fully-embedded and practiced in the course development/delivery.
- f. Adequate funding to facilitate advanced teaching-learning technologies in health professions education.

However, to achieve this future, we must acknowledge the current situation of HPed in the Philippines, and the barriers of the past that prevent us from going to our desired futures.

Pushes of the Present: What is the status quo in health professions education?

The current situation of health professions education has an impact on our desired futures (our “pushes”). These pushes could bring us, or hinder us from arriving at our desired futures, unless properly addressed. In this section, we briefly discuss the pushes of the present in HPed. These are, (1) the rise of AI and other technologies, (2) paradigm shift to a student-centered, outcomes-based, interprofessional collaboration, (3) globalisation of healthcare professions, (4) disasters, (5) governance problems, and (6) evolving mindset of social and cultural inclusivity.

a. The rise of AI and other technologies, coupled with digital literacy demand

As early as 2018, health care delivery has been impacted by the rapid transition from one based on information to one based on artificial intelligence (AI) (Combs, 2018; Wartman and Combs, 2018). By 2019, it has been recognised that AI has the potential to impact almost every aspect of *health* care, from detection to prediction and prevention (Wiljer and Hakim, 2019). Thus, it was recognised as early back then that healthcare professionals should be able to leverage data platforms, analyse patient outcomes, and communicate big data to patients. Without these skills, the healthcare professional could fail to deliver the best possible outcomes for the patient (Combs, 2018). In response to this, several technologies have been emerging for the training of future healthcare professionals (Fifelski et al, 2018; Kortessniemi et al, 2018; Shorey et al, 2019; Corral, 2020). AI has been used for delivery of health professions education (Costa-Dookhan et al, 2025), although some tools remain underutilised (Moskovich and Rozani, 2025) perhaps due to lack of trust on AI (Sharab et al, 2024) and the paucity on the ethics of use

of AI. Also, calls for collaboration between data scientists and education scientists further highlight the need for digital literacy in healthcare (Tolsgaard et al, 2020).

b. Paradigm shift to student-centered, outcomes-based, interprofessional and collaborative education

Interprofessional education has been getting attention as a practical approach in the training of future healthcare professionals (Shashidhara et al, 2024). According to the 2022 Global IPE Situational Analysis Results Final Report by The Global Network for Interprofessional Education and Collaborative Practice Research, the data showed that there is further potential for movement towards establishing more interprofessional education programs globally (Khalili et al, 2022). Data also show that various healthcare professionals are demonstrating readiness towards IPE (Shashidhara et al, 2024). Though the extent of learning has yet to be determined through IPE, it has been shown that the experience allows the future healthcare professional to collaborate as a team when managing a group of patients, and learning how to collaborate through hands-on experience on the roles and responsibilities of each healthcare professional when managing a patient inside the clinic (Davies et al, 2024). In the Asian context, though the iteration of healthcare profession education in the West Pacific Region (including the Philippines) does not exactly present as IPE, it seems to be present and implemented in most schools of nursing in the region (Ngayaan et al, 2024). Moreover, in clinical practice, interprofessional collaborative practice is being utilised by healthcare leaders to improve health outcomes (Meyer et al, 2025).

c. Globalization of healthcare professions

Globalization is defined by the Peterson Institute for International Economies (2018) as “the growing interdependence of world’s economies, cultures, and populations brought about by cross-border trade in goods and services, technology, and flows of investment, people, and information”. Globalization has caused fundamental changes in our society as a result (Huynen et al, 2005). Healthcare professions and education are affected by globalization (Hodges, 2018; Segouin et al, 2005). The most profound effect of the globalization of healthcare professions is the migration of healthcare professionals from developing countries to developed countries (Clarke et al, 2006). This is due to the poor and dysfunctional healthcare and economic systems in the country. Consequently, healthcare workers from developing countries are motivated to “go to greener pastures”. This “brain drain” has a negative impact on the developing country because it loses its healthcare professionals needed to keep a country’s citizens healthy.

The declaration of the ASEAN Economic Community was signed in Kuala Lumpur in 2015. According to the ASEAN website, its goal is “to create a stable, prosperous, and highly competitive economic region. Three core elements under the competitive region are: (1) Competition policy; (2) Consumer Protection; and (3) Intellectual Property Rights (IPR)”. The ASEAN Economic Community eases cross-border movement, which has the potential to facilitate the movement of healthcare professionals, promote research collaboration, and increase access to quality healthcare across member states. promoting collaboration on research and development, and increasing access to quality healthcare services across member states.

However, mutual recognition agreements between countries have been slow, and so the effect of healthcare worker mobility across the ASEAN states have been minimal (Te et al, 2018).

A consequence of globalization is that almost every country wishes for internationally competitive standards for medical education (Stevens and Goulbourne, 2012). Benchmarking education to international standards can foster a culture of quality (Robinos and Alcazaren, 2023). But this can also be driven by an export culture (Macagba, 2023). Regardless of the motive, care must be taken that globalization of healthcare and health professions education will be for the benefit of everyone (Segouin et al, 2005).

d. Disasters & unstable environmental conditions (lessons from the COVID-19 pandemic)

Disasters can greatly impact the delivery of HPED (Hebeci, 2023). Damaged facilities and teaching materials can greatly disrupt the flow of schooling. Moreover, disasters could impact both the teacher and the learner psychologically, resulting in demotivation. Studies also show that extremes in weather could also affect learning, as shown in test scores in Australian students during a heat wave (Srivastava et al, 2022). Knowing that disasters could negatively affect education, it is imperative that the Filipinos are well equipped to face disasters.

The COVID-19 pandemic was a black swan that blindsided the global community. It had a negative impact on most aspects of life, including education. Due to the highly infective nature of the virus, lockdowns were enforced globally. This forced the shift of the delivery of learning from the traditional classroom to the virtual classroom. Somehow, this was a game changer for the delivery of education, and it is recognized that educators worldwide have to embrace some form of hybrid learning (Sahu and Dalcik, 2023). However, the situation for a skills-based profession such as the healthcare profession is different. Training as a healthcare professional requires clinical training and training on invasive procedures. But because of class suspensions, overall clinical training and training on invasive procedures was disrupted, and training hours were prolonged (Dedeilia et al, 2023).

On the other hand, the COVID-19 pandemic was also seen as a catalyst for transformation in health professions education. The health professions education community learned the following lessons during the pandemic, according to Lucey and colleagues (2020): (1) Support a robust public health response to the pandemic; (2) adapt curriculum to current issues in real time; (3) graduate a class of well-prepared healthcare professionals without lowering standards; (4) protect limited educational resources and treat learners equitably; and (5) engage in crisis communication and active change leadership.

e. Governance problems (political will, decision making in conduct of classes)

Among other things, ensuring the delivery of quality education is one of the obligations of any government. However, research has shown that governments in developing countries often poorly deliver health care and education to its citizens. Education is vulnerable to bad governance (Saguin, 2019). Therefore, health endpoints and quality of life in these countries also tend to be more dismal (Jayachandran, 2015). In the Philippines, there seems to be a prevalence of weak leaders, an absence of government control, and a political system that allows vested

interest to influence decision-making. Moreover, we never successfully harnessed education in order to serve the needs of the economy. (Maca and Morris, 2012). Some of the problems plaguing the delivery of education in these countries include graft, corrupt practices by asking for bribes, worker absenteeism, shirking of responsibilities, and perverse incentives (Jayachandran, 2015). Accessibility to health care centers and education providers, and low salaries of workers in these professions contribute to these problems. Moreover, the public are generally unaware of their rights as consumers of healthcare and education services; therefore, they are prone to abuse. (ibid.).

f. Evolving mindset of social and cultural inclusivity

Social inclusion, as defined by the World Bank (n.d.) is the “process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity”. Diversity advocate Verna Myers helps us visualize the meanings of diversity and inclusivity: “*Diversity is being invited to the party; Inclusion is being asked to dance.*” (Stanford, 2020). This means that there must be a conscious effort to remove barriers for communities which were traditionally “othered” due to their gender, age, location, occupation, race, ethnicity, religion, citizenship status, disability, and sexual orientation and gender identity (SOGI), among other factors. Removing barriers for these communities can help us move forward, e.g., alleviating poverty (World Bank Group, n.d.).

In the healthcare setting, building a healthcare workforce coming from different walks of life can help us improve health outcomes especially for marginalized communities. An example of a manifestation of inclusivity is respect for all members of the community through language (e.g., the use of preferred pronouns). This can be crucial because how certain communities are perceived impacts the level of care that they receive (Deakin University, n.d.).

To build an inclusive healthcare workforce and an inclusive healthcare setting requires health professions education to promote diversity by fostering attitudes of inclusion (Edgar et al, 2024). Fostering attitudes of inclusion in health professions education can help promote diversity in the workforce. Consequently, a diverse workforce can help address persistent problems plaguing the community, and improving their health outcomes (Edgar et al, 2024). A study by Gomez and Bernet (2019) finds that patients treated by a diverse healthcare workforce had better health outcomes. Other advantages of workforce diversity are improvement in creativity and decision-making, promotion of professional collaboration, and greater employee engagement (Khuntia et al, 2022).

Weights of History: What forces are holding us back from attaining this future?

Certain barriers from the past could prevent us from attaining the future that we desire for the HPED in the Philippines. In this section, we describe briefly these barriers and how these barriers could hinder us from getting where we want to be. These barriers are (1) essential institutions and stakeholders are not fully capacitated and equipped to be abreast of remote learning strategies; (2) current remote learning strategies do not deliver the desired hard skills

and competencies expected of each course programs; (3) professional licensure examinations mostly focus on knowledge-based competencies; (4) learning is oftentimes hampered due to internal and external factors i.e., suspension of classes, natural calamities, disasters, national holidays, etc.; and (5) teacher-centeredness model.

- a. Essential institutions and stakeholders are not fully capacitated/equipped to be abreast of remote learning strategies; thereby leaving them to make strategies of their own.*

That both the student and the teacher are unprepared for remote learning was manifested during the pandemic (Rakhmetov et al, 2021). One of the primal challenges during this time of online learning was accessibility to the internet. While many claimed to have internet connection, the connectivity was unstable. Additionally, power interruptions were sometimes encountered. Put together, this made online learning somehow untenable (Dayagbil et al, 2021). This problem is also observed in other countries as well (Ahmad et al, 2021)

Moreover, teachers who have been used to teaching in the traditional manner may be hesitant to shift to using technology in the classroom, especially the virtual classroom. The reasons behind this are: discomfort in using new technology, lack of perceived benefit in using technology, lack of skills, and the fear of “looking stupid” in front of more technology-savvy students (Thalberg, 2019).

Also, during this time, learning was unceremoniously interrupted by the pandemic. Therefore, teaching-learning activities were forcibly shifted from teacher-centered learning to independent learning. This sudden shift was a difficult transition not only for the student, but also for the teacher, who suddenly had to redesign his/her teaching style to fit the then new norm (Dayagbil et al, 2021).

- b. Current remote learning strategies do not deliver the desired hard skills and competencies expected of each course program.*

With the current remote learning strategies, some skills cannot be taught online effectively. Examples of these are hands-on subjects such as surgery. These subjects require physical movement and practice, which are most effectively taught in person. Most likely, with the current technology in place, it might not be possible to simulate a physical learning experience, and may not be the best way to teach it (University of Illinois Springfield, n.d.).

- c. Professional licensure examinations mostly focus on knowledge-based competencies*

The licensure examinations are a crucial quality control mechanism, ensuring that the individual applying for permission to work for a certain profession has the baseline skills to perform the said profession, e.g., physicians, nurses, etc. When done well, licensure examinations could be a predictor of competence (Kane, 2005). However, there have been informal reports on test questions that are not relevant in testing the knowledge of the test taker, pervading various licensure examinations from recent takers. If these reports are validated, these questions could throw doubt on the validity of the licensure examinations.

However, professionals still are of the opinion that licensure examinations are relevant quality control measures.

d. Learning is oftentimes hampered due to internal and external factors i.e., suspension of classes, natural calamities, disasters, national holidays, etc.

According to EDCOM, an estimated 32 teaching days were lost in the school year 2023 - 2024 due to high index and other monsoon-related calamities. This year, in March 2025 alone, at least 5 class suspensions have been declared in various locations in the Philippines due to a very high heat index (GMA Integrated News, 2024). For days where the class suspension was due to heat, in person classes were substituted for online synchronous or asynchronous classes. The problem with asynchronous classes in the Philippine context is that with the current setup, the Filipino learner is not ready to shift to online learning. These are due to resources, technical issues, and methodological issues (Ablao et al, 2022)

e. Teacher-centeredness model

Traditionally, knowledge has been imparted to the student by the teacher as the authoritative figure and the source of knowledge. In this model, the teacher can control the order and flow of the class (Ahmed et al, 2022). In the Philippine setting, having the teacher as the centre of instruction has been the norm for many years now. Even through the pandemic, a teacher-centered learning approach has been adopted (Bautista and Aranas, 2023). Most likely this is because the authority of the teacher is culturally valued among Filipinos (del Valle, 2022). In the study of Del Valle in 2022, teacher authority was deemed to be central in understanding good teaching within a specific classroom context. However, with academic caring, teacher-centered and learner-centered learning could be bridged (del Valle, 2020).

Key Assumptions for the Pushes of the Present

Based on the pushes of the present, four scenarios were developed for the futures of health professions education: (1) the business-as-usual scenario, or the scenario where nothing changes; (2) the preferred scenario, or the scenario where proactive and systemic changes are made to achieve this future; (3) the disowned scenario, or the scenario where the changes caused undesirable effects; and (4) the integrated scenario, which contains elements of the preferred and the disowned scenario. The key assumptions for pushes of the present are shown in Table 2.7.

Table 2.7. Key assumptions for the pushes of the present

Factor	Business-as-Usual	Preferred	Disowned	Integrated
The rise of AI and other technologies, coupled with digital literacy demand	Several AI tools and technologies are available. However, only a small percentage of the population are fully capable of maximising the use of AI and other technologies for learning. Some members have knowledge of, but not fully skillful. The remaining population are not capable of using technology for learning	Several AI tools and technologies are available. AI and technologies are fully integrated into learning. All stakeholders are very literate in the use of these technologies to maximise learning.	Several AI tools and technologies are available. A limited percentage of the population knows how to use technology. However, all stakeholders reject the use of, or misuse AI and technology for learning.	Several AI tools and technologies are available. Majority of the stakeholders are capable of using AI and technologies for learning. However, they do not prioritise their use for learning.
Paradigm shift to student-centered, outcomes-based, interprofessional and collaborative education	Students are increasingly able to practice self-directed learning, achieve the program outcomes upon graduation, practice IPE/C but there are gaps in the implementation process	Students learn independently (with minimal faculty supervision) and able to achieve the desired outcomes aligned with market demands; able to collaborate effectively with other healthcare professions students	Students remain dependent on their teachers to learn content; student outcomes are not in line with the market demand; IPE/C is known but is not fully realized	Students are to learn through a combination of teacher-facilitated and self-directed learning; are able to achieve the program outcomes upon graduation; and some, but not all are able to participate in IPE/C
Globalization of healthcare professions	Students are increasingly updated with the latest global updates and EBPs, but are not able to practice them due to several resource limitations	Students are globally-competitive, with updated knowledge on evidence-based practices, and are able to utilize them in their education/training	Students are not fully familiar with the trends/EBP of global healthcare and remain dependent on external resource persons/online search for updates	Students are regularly updated with the latest global updates and EBPs, and are able to utilize them, but resource gaps impair the ability to others to achieve such goal

Disasters and unstable environmental conditions (lessons from the COVID-19 pandemic)	Digital and alternative learning methods are utilized, but on a reactive basis (only when suspensions are declared.) There are ample facilities and technologies made available to its stakeholders; but is not completely encouraged / empowered.	Teaching and learning strategies completely integrate digital/alternative learning methods, aptly supplemented by new technologies (personal haptic simulators, on-demand learning modes, etc). The courses do not fully require physical classrooms to be delivered.	The stakeholders of UPM mainly utilize on-site delivery of learning.; thereby, becoming greatly affected by class suspensions/external events. The area around UPM is sunken due to persistent climate change; hence, some classes are delivered online and done physically when the environmental conditions permit.	Some of the stakeholders of the Univ are capacitated and equipped towards remote learning, but are not yet completely incorporated in all course programs.
Governance problems (political will, decision making in conduct of classes)	Uncoordinated prioritization and decision-making processes between concerned government offices and academic institutions on institutionalizing processes for remote leaning; there are improvements in government funding, but they are still inadequate	Streamlining of procedures in instituting remote learning guidelines due to force majeure	Non provision of resources and processes to institute remote learning due to force majeure.	Development of guidelines for class suspension and remote learning and provision of resources
Evolving mindset of social and cultural inclusivity	Social and cultural inclusivity is somehow observed by teachers during HPED delivery but not deliberately integrated in the curriculum implementation across all programs	Social and cultural inclusivity are integrated in the delivery of HPED curricula across all programs and are inculcated among teachers and learners.	Teachers and learners remain to be socially and culturally exclusive most of the time.	Teachers and learners somehow demonstrate social and cultural inclusivity but not consistently.

Key Assumptions for the Weight of History

Similarly, the weights of the history were also mapped in line with the four future scenarios described earlier are shown in Table 2.8.

Table 2.8. Key assumptions for the weight of history.

Factor	Business-as-Usual	Preferred	Disowned	Integrated
Current remote learning strategies do not deliver the desired hard skills and competencies expected of each course program.	Remote learning strategies are in place, but are not fully maximised for teaching-learning activities (TLA). Classroom delivery is still the norm. Unforeseen events disrupt learning. Because remote learning strategies are not fully utilised, students' skills and competencies are limited.	Remote and effective learning strategies are in place and are fully integrated into the TLAs and complement the classroom. In spite of unforeseen events, learning is not discontinued. Remote learning achieves transfer of hard skills and competencies.	Remote learning strategies are in place, but are designed poorly, and therefore unutilised. Unforeseen events disrupt learning. Students do not learn the desired hard skills and competencies.	Remote and effective learning strategies are in place, and are fully integrable into the TLAs. Not everyone embraces remote learning. Only a percentage of students gain hard skills and competencies.
Professional licensure examinations mostly focus on knowledge-based competencies	National licensure examinations are mostly knowledge-based and there are initiatives to make it responsive to the demands of outcomes-based education	National licensure examinations for health professions education are reflective of the goals of outcomes-based education, assessing the knowledge and skills required for safe/effective healthcare practice	National licensure examinations remain knowledge-based; hence, schools remain educated in the traditional content-based model.	National licensure examinations reflect the competencies related to the program outcomes, assessment of a few skills among the graduates; hence, schools still emphasize content to become a licensed HCP
Learning is oftentimes hampered due to external factors i.e., suspension of classes, natural calamities, disasters, national holidays, etc.	The curriculum/course delivery is not fully responsive to instituting digital and alternative learning methods; to make-up for the lost time and ensure outcome achievement, faculty have to provide additional activities to students.	Develop curricular resilience to ensure learning continuity - learning activities are not hampered by external factors	When there are external factors (class suspensions), learning goes to a complete stop.	Accommodation of digital, alternative, and self-directed teaching-learning strategies as needed/required by the external circumstances.

Essential institutions and stakeholders are not fully capacitated and equipped to be abreast of remote learning strategies; thereby leaving them to make strategies of their own.	The university and its constituents consider remote learning as a secondary option for instruction, utilized only in response to external events. Capacity building and improvements are provided but remain to be superficial and not integrated across institutions.	All stakeholders of the university are trained, empowered and encouraged to completely use the latest technology and advancements in the delivery of HPED learning	The university and its stakeholders have not fully adapted to the changes in instruction delivery - only a few are competent in the methods and are the ones who are able to deliver.	Some university stakeholders are fully capacitated towards the use and incorporation of remote learning, in course delivery.
Colleges are in silos.	Colleges tend to deliver HPED in isolation with the mindset that their different programs have their own context and are distinct from other colleges but there are efforts to facilitate interprofessional education and collaboration.	Colleges share their best practices maximizing interprofessional education and collaboration, enhancing similarities and recognizing differences in the conduct of HPED delivery.	Colleges deliver HPED exclusively focusing on their own context and the distinction of their programs from others. Ad hoc decision making by colleges separately.	Colleges deliver HPED with interprofessional education and collaboration but still have an isolated mindset with regard to their programs.

SCENARIO BUILDING

Based on the key assumptions on the pushes of the present and weights of the history, the group synthesized the descriptions for the following scenarios, which reflect the (1) business-as-usual, (2) preferred, (3) disowned, and (4) integrated futures of health professions delivery in UP Manila by 2058. These are shown in Table 2.9.

Table 2.9. Descriptions for future scenarios.

Futures	Scenario narrative
Business-as-usual:	By 2058, having available tools and ample technologies, remote learning strategies are in place. However, these are not fully maximized for teaching and learning . Classroom delivery is still the norm; remote learning is a secondary option, only done on a reactive basis.
<i>“Dream On”</i>	Some stakeholders are increasingly capable of facilitating digital/alternative learning methods. Improvements and capacity building are provided but not fully integrated. Faculty have to provide additional activities, and students need to keep up with the courses, to ensure outcome achievement. Students are increasingly able to practice self-directed learning and are increasingly updated with global updates. But, with resource limitations, application of skills and competencies are limited. Stakeholders are not completely encouraged/empowered. Prioritization and decision-making processes are not fully coordinated; funding is still inadequate. There are initiatives to make national licensure examinations responsive to outcomes-based education and the new generation of learners. There are also efforts to facilitate interprofessional education and collaboration; however, these are not deliberately integrated in the course delivery.
Preferred:	By 2058, learning and instruction of different course programs at UP Manila have fully incorporated and are delivered using various digital/alternative learning techniques and strategies . These techniques include several AI tools, robotics, and emerging technologies which are made available to all stakeholders. All implemented curricula in the university prove to be climate- and disaster-proof and fully integrates collaboration and interprofessional education into its delivery.
<i>“We are the Champions”</i>	During this period of technological advancements and innovations, the students, faculty, and the administrators are all literate, equipped, and capacitated in participating in digital and self-directed learning. The thrust towards digital learning is adequately supported by the government and the guidelines on conduct of remote learning in the country have already been streamlined. By 2058, the students and graduates of UPM are independent “e-learners” who possess the necessary knowledge and skills of their respective professions, remain culturally sensitive, and know how to collaborate effectively with other health-professionals.

Disowned: <i>"I Knew You Were Trouble"</i>	By 2058, UP Manila may have several tools and technology available but little to no improvement on its facilities, processes and resources to adopt digital/alternative technologies teaching and learning. A small percentage of stakeholders have the know-how and others either reject the use of AI and technology or misuse them for learning. Most students remain dependent on on-site learning and on their teachers. When there are extreme external conditions, students/faculty resort to online learning. With the teacher-centered set-up, delivery of instruction remains to be traditional, not utilizing interprofessional education/collaboration. UP Manila colleges/units are socially and culturally exclusive and remain to work in silos. Program outcomes are partially aligned with the market demand wherein trends and evidence-based practice of global healthcare are not completely considered. With poorly-designed remote learning, there is still disruption of learning, especially pertaining to developing the desired hard skills and competencies and stakeholders have not fully adapted to the changes in the instructional delivery.
Integrated: <i>"Didn't We Almost Had It All"</i>	By 2058, several infrastructure will be in place such as AI tools, technologies, and policies that will enable effective self-directed learning and interprofessional education (IPE) in UP Manila. Everyone is fully capacitated in using these technologies. Students are regularly updated with the latest global updates and are able to utilise them. However, not everyone is willing to embrace these learning strategies. Moreover, resource gaps make these resources inaccessible and impairs the ability to achieve goals. Therefore, AI tools and technologies are not maximized and effectively become ineffective for teaching. Self-directed learning, interprofessional education, and inclusivity are integrated into teaching-learning strategies. However, not everyone participates in self-directed learning and IPE. Moreover, some still have an isolated mindset. Moreover, teachers and learners do not consistently demonstrate social and cultural inclusivity. National licensure examinations reflect the competencies related to the program outcomes, assessment of a few skills among the graduates; hence, schools still emphasize content to become a licensed HCP.

BACKCASTING THE PREFERRED FUTURE

Meanwhile, backcasting was performed to determine the goals, objectives, and actions that would enable the preferred future of the health professions delivery in UP Manila by 2058. It is composed of three strategic goals across three time horizons: 2046 - 2058, 2035 - 2045, and 2024 - 2034.

Strategic Goal: Building tracks

Horizon 1: 2024-2034

The objectives and specific actions for this strategic goal and horizon are shown in Table 2.10.

Table 2.10. Objectives and specific actions for horizon 1.

Objectives	Specific Actions
To improve the physical and digital infrastructure of UPM that would support remote-learning of all course programs in the future by 50% in 2034	Enhance the current learning management system being used with the aim of making it adaptable to whatever form of remote teaching-learning strategies that may arise in the future.
	Upgrade current facilities and resources (i.e., classrooms, connectivity infrastructure, digital storage equipment , etc.) by acquiring updated hardware and software, with capabilities of adapting to future advancements.
	Secure funding for the physical and digital infrastructures
To equip all stakeholders of the university with competencies to be adept with present and future technological advances in 2034	Benchmark with other educational institutions abroad, together with the bottoms-up approach (consultation with stakeholders), to determine the appropriate and updated practices to enable stakeholders in integrating technology and other alternatives modes of teaching-learning in HPED
	Implement (and continuously evaluate) capacity-building programs that will enable all stakeholders to utilize digital and alternative technologies in a resilient, outcomes-based, and self-directed HPED
To streamline the bureaucratic processes that are being practiced in the University in 2034	Analyse the current processes and practices to create a more lean, effective and efficient process.
	Implement quality assurance measures in acquisition of funds and equipment for efficient processes.

Strategic Goal: Train on the tracks

Horizon 2: 2035-2045

The objectives and specific actions for this strategic goal and horizon are shown in Table 2.11.

Table 2.11. Objectives and specific actions for horizon 2.

Objectives	Specific Actions
To fully incorporate remote teaching-learning techniques and strategies in all course offerings of UPM in 2045	Revision of the existing teaching learning strategies of all courses to models that would include the use of advanced technologies.
	Integrate the TPACK model (technological, pedagogical and content knowledge) in designing instructions that are flexible in all modes of delivery
	Continuous upskilling of all stakeholders, ensuring that everyone is capacitated to use technology for teaching-learning activities
Design courses and curricula that introduce technological advances in the health professions in 2045	Conduct research activities to develop new courses on technological advancements in the different health science programs
	Utilize evidence-based instructional materials in the effective conduct of technology-related courses
Collaborate with other programs/units to uphold interprofessional education in 2045	Create a learning environment that simulates real world scenarios that encourage various health professionals to collaborate towards solving a clinical or health problem

Strategic Goal: Full speed ahead

Horizon 3: 2046-2058

The objectives and specific actions for this strategic goal and horizon are shown in Table 2.12.

Table 2.12. Objectives and specific actions for horizon 3.

Objectives	Specific Actions
To institutionalize an advanced and resilient teaching-learning system that is technologically-driven across all health professions education courses in 2058	Sustain the accessibility and utilization of robust, technologically-driven learning systems/processes across all institutional units/colleges
	Ensure that all stakeholders are fully competent to utilize self-directed and technologically-driven teaching-learning methods across all HPED courses
To produce healthcare professionals that are technologically-adept, lifelong learning-driven, globally-competitive, and responsive to the needs of the Filipino people in 2058	Guarantee implementation and evaluation of curricula that are responsive to the emerging local/global needs and trends.
	Promote universal and inclusive access to innovative and resilient health professions education
To capacitate other HEIs on the innovative and resilient HPED delivery in the country in 2058	Capacitate other higher education institutions (HEI) across the country towards technologically-driven and resilient HPED, considering differences in resources and settings
	Ensure adequate and sustainable funding allocation to develop technologically-driven and resilient health profession courses of HEIs.

ROADMAP TO THE FUTURES OF HEALTH PROFESSIONS EDUCATION DELIVERY IN UP MANILA BY 2058

Finally, the group proposes the following roadmap, so that the University can realize the preferred future of health professions delivery by 2058. Aligning it with the backcasting, it is composed of three phases with particular goals and plan of actions to facilitate coordination across various resources and stakeholders.

Phase 1: 2024 - 2034 | Upgrading the physical, digital, and human resources, including teaching processes/strategies, to support technologically-driven self-directed learning

Goal No. 1: To improve the physical and digital infrastructures of UPM that would support remote-learning of all degree programs by 50% in 2034

- Conduct a university-wide review of all physical and digital equipment available, to determine the resources required to support remote learning
- Determine the current and emerging technologies for HPed and their appropriateness to the local population through pilot/feasibility studies
- Secure national funding for the improvement of the university's physical and digital infrastructures
- Collaborate with non-government or private institutions, local or abroad, to reinforce the institution's physical facilities for digital learning, that are appropriate for the local context and evolving learner demographics
- Invest in pilot studies for the utilization of AI in HPed, and disseminate results to the stakeholders/wider audience

Goal No. 2: To equip all stakeholders of the university with competencies to be adept with present and future technological advances in 2034

- Identify and train a technical working group composed of representatives and experts from each unit/program, who will serve as the champions/focal persons for technological-driven self-directed learning in the University
- Benchmark with other HEI to determine the current trends and learning strategies that are effective for technologically-driven self-directed learning
- Capacitate all stakeholders to gain familiarity with the tools used for technologically-driven self-directed learning.
- Conduct local studies to determine the feasibility and efficacy of strategies to capacitate the faculty/staff towards digital and self-directed learning, as well as the student feedback to pilot programs

Goal No. 3: To design and pilot programs compatible with technology-driven self-directed learning, and draft policies to guide their implementation

- Review the current status of digital, remote, and self-directed learning strategies practiced by the different units of the University
- Analyze the results of benchmarking activities to determine the utility and feasibility of digital resources for HPED in the University
- Identify specific courses within HPED programs that could pilot the utilization of digital and self-directed learning
- Draft initial policies on the use of AI and other emerging technologies in HPED
- Regularly analyze the results of the pilot programs/courses that utilized digital/self-directed learning, to determine areas for improvement

Phase 2: 2035 - 2045 | Full integration of technologically-driven self-directed learning across health professions education in the University

Goal No. 1: To fully integrate technology in teaching-learning activities in all course offerings of UP Manila by 2045

- Utilize the results of the pilot program course offerings to guide the continuous integration of digital and advanced technologies in HPED
- Upgrade each course/program component, until all of them have integrated technologically-driven self-directed learning in their delivery
- Continuously upskill all stakeholders with evidence-based and emerging strategies towards digital/self-directed learning methods
- Regularly evaluate all programs and courses to ensure achievement of desired learning outcomes and administrative efficiency
- Utilize evidence-based instructional materials in the effective conduct of technology-related courses
- Conduct research activities to develop new courses on technological advancements in the different health science programs

Goal No. 2: To promote collaboration across programs and units within the University to promote interprofessional education through technologically-driven self-directed learning

- Identify best practices across programs/units, and promote sharing of resources to ensure sustainability of technologically-driven self-directed learning
- Pilot interprofessional collaboration programs utilizing advanced technologies and determine the strategies to support the learning across programs/units
- Create learning environments and packages that simulate real-world scenarios and encourage students from various health professions to collaborate

Goal No. 3: To ensure continuous improvement and quality assurance of resources and processes to support technologically-driven self-directed learning in the University

- Secure regular and adequate funding for the continuous improvement and quality assurance of technologically-driven self-directed learning initiatives of the University
- Continuously review existing policies on the use of advanced and emerging technologies for HPED, to ensure their utility to the stakeholders
- Review policies in place to determine bottleneck tasks that impede process flows, and determine if they can be removed or replaced to reduce the time to finish processes
- Implement quality assurance measures in acquisition of funds, equipment, and other resources to support goals
- Continuously collaborate with other institutions, especially international organizations, to ensure global competitiveness of programs and systems

Phase 3: 2046 - 2058 | Ensuring that teaching-learning systems are resilient, self-directed, and technologically-driven

Goal No. 1: To institutionalize an advanced and resilient teaching-learning system that is technologically-driven across all health professions education courses in 2058

- Review physical and digital resources and determine the need for expansion/ migration, to ensure a disaster-proof and resilient system
- Uphold secured systems to fully protect physical and digital infrastructure from internal/external threats
- Promote system self-sustenance by implementing income-generating programs, apart from regular government funding
- Continuously implement quality improvement and assurance measures across all programs/units
- Continuously utilize research-driven and evidence-based methods to implement and evaluate existing methods

Goal No. 2: To produce healthcare professionals that are technologically-adept, lifelong learning-driven, globally-competitive, and responsive to the needs of the Filipino people

- Fully implement technology-driven programs for interprofessional collaboration across courses
- Continuously train and evaluate stakeholders, as well as review and improve program/course delivery
- Continuously implement exchange programs for students/faculty to ensure up-to-date methods for technologically-driven teaching and learning
- Continuously consult with government agencies, professional regulatory groups, and specialty organizations to ensure that graduates meet the competencies required by the health system

Goal No. 3: To capacitate other HEIs on the innovative and resilient HPED delivery in the country

- Collaborate with other HEIs across the country to determine the needs and resources to implement technologically-driven self-directed learning for HPED
- Promote capacity building initiatives for HEIs across the country, considering differences in needs, resources, and settings
- Determine resources and processes that can be shared to other HEIs to increase their capacity towards technologically-driven self-directed learning in HPED
- Collaborate with other HEIs in developing initiatives to assist in integrating technologically-driven self-directed learning in HPED

The graphical summary of the roadmap to the futures of HPED delivery in UP Manila by 2058 is shown in Figure 2.3.

Roadmap to the Futures of Health Professions Education Delivery in UP Manila by 2058

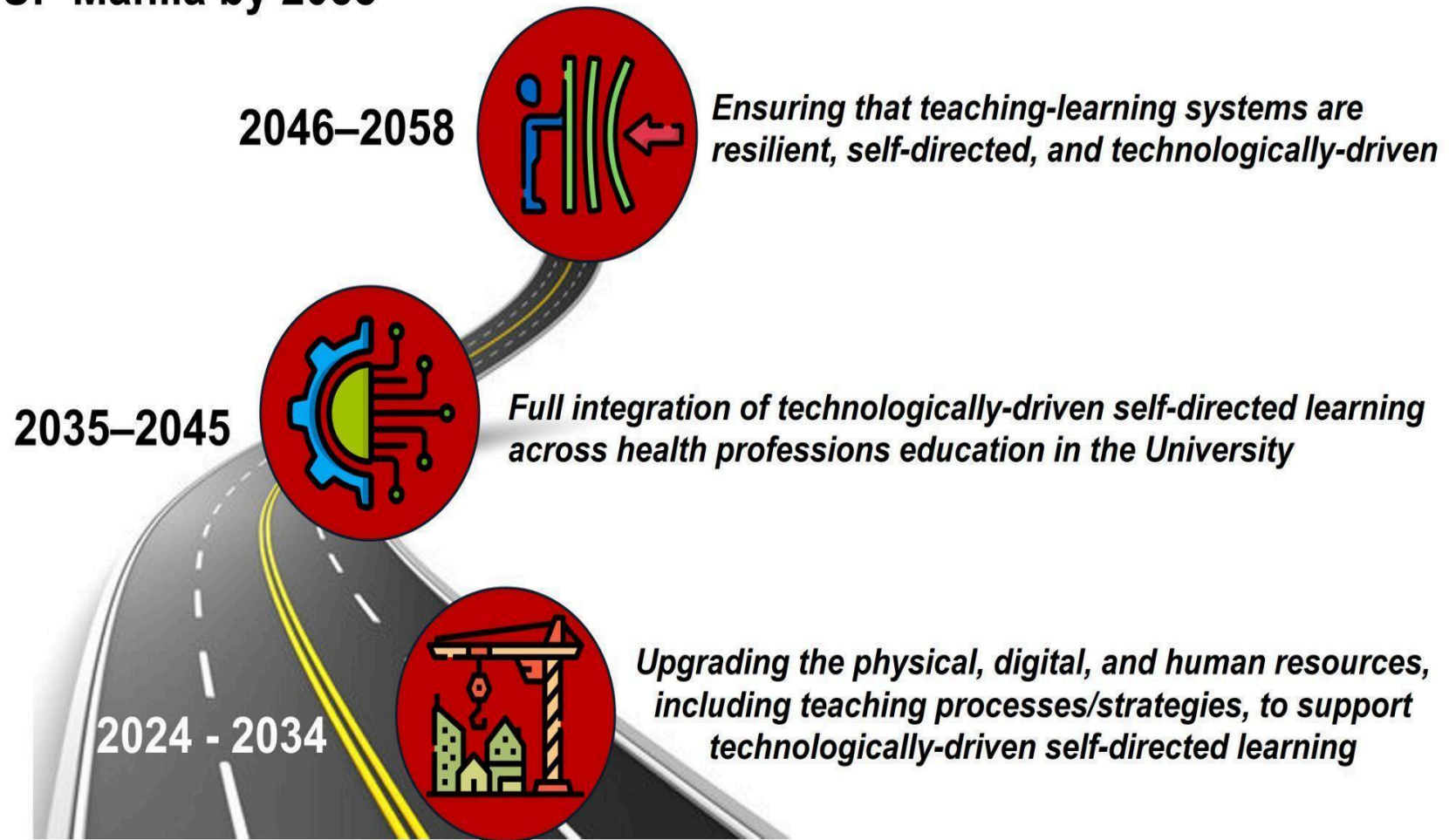


Figure 2.3. Roadmap to the futures of HPEd delivery in UP Manila by 2058.

SECTION 3

THE FUTURES OF EDUCATION OF THE HEALTH WORKFORCE IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058

Contributors:

Assoc. Prof. Aila Nica J. Bandong

College of Allied Medical Professions

Asst. Prof. Ellyn Cassey K. Chua

College of Allied Medical Professions

Assoc. Prof. Malem S. Flores

College of Arts and Sciences

Assoc. Prof. Yves Y. Palad

College of Allied Medical Professions

Dr. Carol Stephanie C. Tan-Lim

College of Medicine

Dr. John Mark S. Velasco

National Institutes of Health

INTRODUCTION AND DESCRIPTION OF THE FOCAL ISSUE

Health Workforce Education at the University of the Philippines Manila

Health and education systems are rapidly changing. With the recent COVID-19 pandemic, educational institutions worldwide had to quickly shift from traditional in-person learning to online alternatives (Chhetri 2021). This shift has significantly accelerated the development of online and blended (i.e., in-person and online) learning such that their merits are now widely recognized in the post-pandemic world (Ahmed MS, Soltani A, Zahra D, et al. 2025). In addition to changes in the available modes of instruction, the learning preferences of students have also undergone changes, becoming more characteristic of Generation Z (“Gen Z”): technology-oriented, experiential, individualized, collaborative, and socially relevant (Hamzah, Abu Seman, Ahmed 2025). Amid these developments, artificial intelligence has also been gaining traction for its potential to revolutionize education by optimizing certain processes (e.g., administrative tasks, giving feedback to students) and tailoring teaching-learning methods to an individual’s needs (Hamzah, Abu Seman, Ahmed 2025). These developments have made conventional teaching at risk of becoming outdated and ineffective in meeting current and future healthcare demands. Running parallel to these changes in the educational sector are developments in the volatile, uncertain, complex, and ambiguous (VUCA) healthcare landscape in the Philippines (e.g., digital health innovations, increasing focus on prevention, more support for health financing) (Beltran 2024). The ever-changing nature of both education and health in the country call for a dynamic and relevant health education that can equip prospective and current members of the health workforce to respond to the evolving health needs of Filipinos.

Context

The health and health professions education landscape in the Philippines is becoming increasingly complex, uncertain, and rapidly evolving due to shifting global and local health challenges, technological advancements, and changing societal and client/patient needs and expectations.

During the COVID-19 pandemic, the University of the Philippines adapted by shifting to online learning, virtual simulations, and hybrid clinical training (Genuino, MA, Dizon 2025). Similarly, the Department of Health and PhilHealth released guidelines to support the adoption of telehealth services, enabling Filipinos to access medical advice remotely (Department of Health, Department of the Interior and Local Government, & Philippine Health Insurance Corporation, 2021). Platforms such as KonsultaMD and HealthNow became essential in bridging healthcare gaps throughout the country (KonsultaMD 2022). These changes highlight how the Philippine healthcare and medical education must continuously evolve to equip future professionals with the necessary skills to navigate an increasingly complex and technology-driven healthcare environment.

Further influencing the changes in the health and health professions education are political, economic, social, and environmental factors that impact access, quality and

effectiveness. For instance, the Universal Health Care Act, signed in 2019, aims to provide all Filipinos with access to affordable and quality healthcare (Universal Health Care Act 2019). However, its implementation strains medical education by creating higher demand for more healthcare professionals, particularly in the primary care and underserved rural areas. Moreover, as revealed in a report prepared by the Human Resources for Health 2030 (HRH2030) consortium, the Philippines continues to face challenges in healthcare due to inequities in access to healthcare and unequal health workforce distribution across the country (Human Resources for Health 2030 Consortium 2020). Most doctors, nurses, allied health practitioners, and other healthcare professionals are concentrated in the cities, leaving rural and remote areas underserved and struggling with limited access to quality care. This imbalance in workforce distribution is exacerbated by poor retention of healthcare professionals. Likewise, the high demand for Filipino nurses and doctors abroad has led to a shortage of healthcare professionals in the country. Many medical and allied medical graduates seek better opportunities abroad due to low compensation, poor work conditions, and limited career growth/advancement. These issues result in a disproportionate healthcare professional-to-population ratio, making it difficult to meet the growing demand for healthcare services. According to a policy brief that accompanied the aforementioned HRH 2030 report, the Philippines has 19.7 human resources for health for every 10,000 citizens, well below the World Health Organization's (WHO) benchmark ratio of 44.5.

Addressing these issues requires not just reforms in health policies, infrastructure, and support, but also an education system that produces healthcare professionals who will serve the country and respond to the needs of Filipinos (Human Resources for Health 2030 Consortium 2020).

Advancements in technology, such as the use of artificial intelligence, robotics, mobile apps, wearable technology, and electronic health records are transforming the way healthcare is delivered (Ramachander, Gowri, Selvi 2025). These advancements are reshaping problem identification, diagnosis, and client management toward precision/individualized care, better outcomes, efficiency, and access. Healthcare professionals, therefore, must acquire necessary knowledge, skills, technical proficiency, literacy, and capacity to judiciously use these technological advancements to effectively integrate new and emerging technologies in practice and in making informed decisions.

Patients' changing healthcare needs and expectations, as well as shifts in population demographics and health crises, demand capable healthcare professionals that can adapt to changes in health policies and service delivery. For example, the aging population and prevalence of chronic, non-communicable/lifestyle-related diseases shift the focus toward preventive care and health promotion (Kampfen, Wijemunige, Evangelista 2018). Technological advancements and ease of access to health information raise patient/client expectations for quality care (Zainal, Hui, Thumboo, Fong, & Yong, 2024). Lastly, emerging health crises such as pandemics and other emerging infectious diseases, and climate-related health issues (e.g. natural disasters, rising temperatures) further put a strain on healthcare systems and call for health professionals to be skilled in managing complex situations, delivering responsive and

inclusive healthcare (Alami, Lehoux, Fleet 2021). As a result, health education now includes disaster preparedness, public health training, and pandemic response programs to prepare future professionals to such challenges (Eid-Heberle & Burt, 2023; Kreitlow, Steffens, Jablonka, & Kuhlmann, 2021).

There is a need to explore possible futures that may influence plans and strategies to ensure a future-ready, adaptive, and responsive health professions education. The following questions should be addressed:

- What healthcare competencies will the future workforce be expected to possess?
- What advancements in healthcare service provision do we foresee?
- What teaching-learning strategies would be effective for (and preferred by) future learners?
- What advancements in educational strategies do we foresee?

CAUSAL LAYERED ANALYSIS

A causal layered analysis was performed to explore and identify the forces that drive the issues that surround health workforce education at the University of the Philippines Manila and unpack underlying perspectives and worldviews that influence these issues. Issues/problems of educating the human resources for health center on declining quality and curricula not evolving as quickly as the changes in health and education milieu. Systemic factors that cause these issues/problems include financial, bureaucratic, and socio-political challenges, which hinder timely development and implementation of responsive innovations in education. From a deeper perspective, it appears that these factors and resulting issues/problems are deeply rooted in a conservative worldview that puts high regard on and respect for traditions and rules. Systems and processes move slowly, lumbering through each step.

Through causal layered analysis, solutions and perspectives on the future are determined– a transformed analysis. Health workforce education should be responsive and dynamic, supported by adequate funding, infrastructure, and a facilitative socio-political environment (i.e., adhocracy). Systems and processes are agile, responsive, and relevant to evolving landscapes.

The results of the causal layered analysis is shown in Table 3.1.

Table 3.1. Results of causal layered analysis.

Current Causal Layered Analysis		Transformed Causal Layered Analysis
- Declining quality of education; - Education not evolving as quickly as changes in health demographics; - Education not evolving as quickly as changes in the demographics of learners	Litany or Problem	- Education that is responsive and dynamic - Global classroom
- Difficult to incorporate innovations in the curriculum due to cost and access issues - Multiple bureaucratic layers of approval before instituting curricular changes or procuring equipment - Insufficient funding for education - Teacher is overburdened with multiple responsibilities - Government not prioritizing education	System	- Education funding at least 4% of GDP - Teachers receive adequate organizational and infrastructural support - Improved basic education
Conservatism (respect for traditions and rules) - Traditional perspectives and practices in education - Need for bureaucracy to mitigate corruption	Worldview	- Agile education - Global perspective, world-class standards - Adhocracy: flexible, adaptable institutional structures, policies, and processes
- Slowly, but surely - Lumbering	Myth or Metaphor	- Big wheel keep on turnin' - Parkour

ENVIRONMENTAL SCANNING USING THE STEEP FRAMEWORK

Environmental scanning using the STEEP Framework allows for a comprehensive examination of social, technological, environmental, economic, and political factors that could positively or negatively influence an issue, thus providing critical insight into strategizing for possible scenarios. The STEEP analysis provides an overview of the challenges and opportunities in health professions education in the Philippines. Shown in Table 3.2 are the factors identified to be relevant to the issue of health professions education.

Table 3.2. STEEP analysis for healthcare workforce education in the Philippines.

Factor	Opportunities	Threats
Social	Generally increasing interest in enrollment in health sciences brought by: - Increased domestic and global demands for Filipino health workers - Different learning delivery modes available (e.g., distance learning, blended learning, microcredentialing, etc.) “One Health” gaining traction	- Rapidly changing learner demographics and learning preferences - Limited interest among students to serving the underserved - Increased in mental health issues of students - Outdated healthcare practices in the field that could affect potential practicum placements for students - Decreased need for curative healthcare as the approach becomes more preventive - Unequal access to learning delivery modes across the Philippines - Low attractiveness of local health labor market - Low retention in the local health facilities/systems
Technological	- Digitization of teaching strategies (online/virtual learning platforms) - Emerging health technologies - Increasing advanced treatment and health care modalities globally (e.g., personalized medicine, gene therapy/editing, remote robotic surgery)	- Student too dependent on technology - AI could hamper critical thinking - The country is slow to adopt and adapt to advances in technology - Inadequate infrastructure to support virtual learning and other learning modes (e.g., slow internet speeds; unequal network distribution) - Replacement of healthcare workforce by AI and robots - Unequal access to infrastructure and technology for education

Economic	• Opportunity for salary-step-wise adjustments for government officials (including UP Manila personnel) • Improving economic performance of the country • Possibility for start-ups based on research on health technology and other products	• Minimal salary adjustment • Increase in personal tax burden • Inequality of distribution of unavailability of resources (i.e., funds to support education and production of human resources for health) • Poor employment conditions, including low wages, leading to an exodus of healthcare workers and increasing the demand for new healthcare workers • Unequal economic development, affecting students' access to education (i.e., the rich becomes richer, the poor becomes poorer) • Unequal economic development, affecting populations' access to healthcare (i.e., the rich becomes richer, the poor becomes poorer)
Environmental	• One Health approach that unifies and integrates the health of people, animals, and ecosystems	• Global warming leading to more frequent natural disasters which result in frequent disruption of physical classes • Crowding in urban areas leading to heavy traffic, air pollution, unsafe physical classrooms • Obsolescence of need for centralized or physical education facilities due to climate changes • Environmental changes leading to changes in health demographics
Political	• Agenda of the ASEAN and other countries to facilitate collaborations in healthcare education and training • Continuing support from western nations • Strengthening of health professions education as part of the National Human Resources for Health Master Plan 2020-2040 • Inter-agency push for rational and responsive production of human resources for health	• Unstable local and national political landscape • Health being heavily dependent on the agenda of political leaders, leading to instability in prioritization and budget allocation • Unstable geopolitical situation at the global level with the great of conflict/invasion • Changing political landscape in other countries heavily affecting global initiatives for health and education as well as global economic trends • Policies and bureaucratic process in UP not facilitative of efficient curriculum review and revision

The social factors pertain to trends, cultural attitudes, lifestyle changes, population demographics, and societal values that can influence healthcare and health professions education. The increasing interest in health professions education, particularly in medicine, presents a significant opportunity for the healthcare sector (Dalanon, Matsuka 2020). Higher enrollment in health sciences programs means more graduates who can fill critical roles in hospitals, clinics, and community health services. More students in health-related fields also mean a larger pool of future researchers, scientists, and healthcare entrepreneurs who can contribute to medical advancements, public health initiatives, and technological innovations. This increase in students pursuing health sciences can help sustain the country's reputation as a

leading provider of skilled medical professionals. With the rising global and domestic demand for Filipino health workers, UP can capitalize on this trend by expanding programs and innovating curricula (Robredo, Ong, Eala, Naguit 2022). The availability of diverse learning delivery modes allows for more flexible and inclusive access to healthcare education. Additionally, the growing local recognition of the One Health approach, which integrates human, animal, and environmental health, promotes a more holistic and interdisciplinary perspective in training healthcare professionals (Dayapera, Sy, Valenzuela 2024).

However, with these social opportunities come various. The rapidly evolving demographics and learning preferences of students require continuous adaptation in teaching strategies to maintain engagement and effectiveness (Wajdi, Susanto, Sumartana, Sutiarto, Hadi 2024). A declining interest in serving underserved communities may widen healthcare disparities, particularly in rural areas (Human Resources for Health 2030 Consortium 2020). The increase in mental health issues among students is another pressing concern, as it could impact academic performance and retention rates (Serrano et al., 2023; Ann, 2023). Furthermore, outdated healthcare practices in the field (Romero, 2022) could limit students' exposure to modern techniques. Other issues such as unequal access to learning delivery modes (Cardoz, 2022), a low attractiveness of the local health labor market (Human Resources for Health 2030 Consortium, 2020), and high migration rates among healthcare workers (Human Resources for Health 2030 Consortium, USAID, & Department of Health, 2020) pose significant threats to the stability and sustainability of the healthcare workforce. For instance, not all UP Manila students have easy access to high-speed internet (Cardoz, 2022), making it difficult to attend virtual classes or access digital resources. Similarly, graduates are discouraged from pursuing careers in the local healthcare system due to unattractive salaries and poor working conditions, among other barriers (Human Resources for Health 2030 Consortium, USAID, & Department of Health, 2020).

Technological factors, on the other hand, are elements that encompass technological progress, innovation, research and development (R&D), automation, and digitalization, which can present both opportunities and challenges for healthcare and health professions education. Advancements in digital learning platforms (Car et al., 2022) and emerging health technologies (Ramachander, Gowri, & Selvi, 2024) create numerous opportunities for enhancing healthcare education and practice. For example, Labster, a virtual laboratory simulation platform, provides an immersive, interactive, and gamified learning experience (Sack & Nieves, 2023). It also allows students to do self-paced learning, making it an excellent tool for online and hybrid education, and it can be integrated with LMS platforms such as Canvas, allowing educators to track student progress and customize their learning experience. Meanwhile, the increasing adoption of personalized medicine (Ramachander, Gowri, & Selvi, 2024), gene therapy (Schambach et al., 2024), and remote robotic surgery (Godley et al., 2025) demonstrates the growing need for healthcare professionals to be proficient in novel and cutting-edge medical technologies.

Despite these benefits, over-reliance on technology may lead students to become overly dependent on digital tools, making them incapable in the actual setting or when technology is unavailable. This could also potentially hinder their ability to develop critical thinking and

problem-solving skills (Zhai, Wibowo, & Li, 2024). In addition, the slow adoption of new technologies in the country (Romero, 2022) limits access to advanced healthcare education and training, which also poses a threat. For instance, since 2010, mass spectrometry has been used by many countries in identifying pathogens (Ho & Reddy, 2010). In the Philippines, limited laboratories have the equipment to do such analysis in the clinical setting. Moreover, inadequate digital infrastructure, including slow internet speeds and uneven network distribution (Cardoz, 2022), exacerbates inequalities in virtual learning accessibility. The increasing role of AI and robotics in healthcare (Ramachander, Gowri, & Selvi, 2024) also raises concerns about potential workforce displacement. Additionally, the unequal distribution of technological resources across educational institutions and regions further deepens disparities in healthcare training quality.

Several economic factors influence healthcare and health professions education. Potential salary adjustments for government officials and university personnel (Department of Budget and Management [DBM], 2024) and the improving overall economic performance of the country (Department of Finance, 2025) may encourage more individuals to pursue careers in healthcare. The rise of start-up companies based on health technology innovations (Tech Collective, 2025) also creates opportunities for entrepreneurial ventures. However, financial constraints remain a significant challenge. Minimal salary adjustments for healthcare workers (Villamente, 2024) and an increased tax burden (Samson, 2023) could deter individuals from entering or staying in the profession. The unequal distribution of resources (Chi, 2023) affects the quality of healthcare education, as institutions may struggle to secure funding for training programs and research initiatives. Poor employment conditions, characterized by low wages and job insecurity, contribute to the mass migration of Filipino healthcare workers abroad (Human Resources for Health 2030 Consortium, 2020), exacerbating the local healthcare workforce shortage. Furthermore, unequal economic development (Philippine Statistics Authority, 2024) widens disparities in education and healthcare access, creating a cycle in which marginalized communities have limited opportunities to improve their socioeconomic status.

Factors pertaining to environmental concerns, such as sustainability challenges, climate change, natural disasters, environmental care initiatives, and other environmental matters, also influence healthcare and health professions education. The One Health approach, which integrates human, animal, and environmental health (Dayapera et al., 2024), presents an opportunity to develop a more comprehensive healthcare framework. By addressing public health concerns through an ecological lens, healthcare professionals can contribute to more sustainable and effective healthcare solutions. However, frequent natural disasters due to global warming disrupt physical classes and training programs, affecting the education of future healthcare professionals. Disruptions often force educators to skip content, leave topics in the syllabus unfinished, or limit detailed discussions in class. The crowding of urban areas causes traffic congestion, which leads to longer commutes and increased exposure to air pollution for students (Kecorius et al., 2018). All these can interrupt students' learning. Students, especially those who experience long commutes going to the university or those who reside in cramped dorm rooms, may not be able to perform well in class due to reduced sleep time, stress, and

increased fatigue. These scenarios are also evident in educators, who in turn may not be able to effectively teach in class.

Other environmental changes also have a profound impact on health demographics. Rising temperatures and changing precipitation patterns expand the habitats of disease-carrying vectors like mosquitoes (Seposo et al., 2024), potentially leading to increased cases of dengue even in previously unaffected areas. It reshapes health demographics by increasing the burden of infectious and non-communicable diseases, exacerbating health inequalities, and challenging healthcare systems. These environmental factors should also be considered when creating or revising curricula for health professions education.

Lastly, government policies and political stability play a crucial role in shaping healthcare education and workforce development. The ASEAN agenda for healthcare, which includes mutual recognition agreements on healthcare professionals, allows international collaborations that provide opportunities for the exchange of knowledge, training programs, and research partnerships (Association of Southeast Asian Nations, 2009). Continued support from Western nations (Presidential Communications Office, 2025) further enhances capacity-building efforts in healthcare education. The National Human Resources for Health Master Plan 2020-2040 (Human Resources for Health 2030 Consortium, 2020) and inter-agency initiatives may also help in improving the production of healthcare professionals, ensuring a more structured and responsive approach to workforce planning. But political uncertainties create challenges. The unstable political landscape at the local and national levels, such as changes in leadership and policy direction with each new administration (Philippine Daily Inquirer, 2024), leads to inconsistency in governance and public services, potentially affecting budget allocations for healthcare and education. Additionally, geopolitical conflicts may disrupt international partnerships and employment opportunities for Filipino healthcare workers even at the university level. Bureaucratic inefficiencies impact curriculum review and revision, which can hinder the ability of departments and colleges to keep up with evolving needs, potentially compromising the quality of healthcare education.

Identification of Key Factors

Based on the factors identified through environmental scanning, the most crucial ones are determined by evaluating each factor on a 5-point scale—ranging from 1 (low) to 5 (high)—based on its impact, uncertainty, relevance, and controllability. *Impact* is scored according to the magnitude of the factor's effect on the issue in focus; *uncertainty* is scored based on the extent to which a factor can be predicted; *relevance* is rated based on the factor's significance to the issue; and *controllability* is rated based on the extent to which the factor may be managed. Table 3.3 shows the most influential STEEP factors in envisioning different future scenarios in healthcare and health professions education.

Table 3.3. Key STEEP factors.

	STEER Factor	Impact	Uncertainty	Relevance	Controllability	Total Score
1.	Rapidly change learner demographics	4	5	5	5	19
2.	Replacement of healthcare workforce by AI and robots	5	4	4	5	18
3.	Increasing demands for healthcare workers	5	4	4	4	17
4.	Unstable global geopolitical situation (e.g., conflict, invasion)	5	1	5	5	16
5.	Unstable local political landscape and agenda of leaders leading to instability in budget allocation	5	1	5	5	16
6.	Climate change leading to frequent natural disasters	5	1	5	5	16
7.	Unequal access to different learning modes across the country	4	5	3	4	16
8.	Different learning modes available (e.g., distance learning, microcredentialing, etc.)	4	5	5	1	15
9.	Crowding in urban areas leading to heavy traffic, air pollution, noise pollution, etc.	4	1	5	5	15
10.	Inequality of distribution or unavailability of resources	5	1	5	4	15
11.	Curriculum approval process taking too long	5	1	5	4	15

Rapidly changing learner demographics emerges as the top factor in possible scenarios for healthcare workforce education. This factor includes the shift in the learning goals, preferred careers, as well as learning modes of students. The increasing reliance on various learning modes, including distance learning and micro-credentialing, suggests that educational institutions must adopt flexible and technology-driven teaching strategies. However, unequal access to different learning delivery modes remains a major concern, particularly in rural and underserved areas, which could widen disparities in educational opportunities.

Replacement of healthcare workers by AI and robots signifies a major transformation in healthcare education and practice. As automation and digitalization advance, future curricula must integrate AI competencies, critical thinking, and human-centered care to ensure that healthcare professionals remain relevant in a tech-driven landscape. However, the slow adoption of emerging technologies in the country could limit the benefits of these advancements.

The increasing demand for healthcare workers highlights the persistent need for these skilled professionals locally and globally. And without adequate government support, salary improvement, and better working conditions, our country is at risk for further brain drain, which can lead to staffing shortages in the local healthcare system.

Given these factors, the future of the healthcare workforce education in the country will likely be shaped by a combination of digital transformation, policy reforms, and infrastructural improvements. By taking advantage of the opportunities and proactively addressing the threats that come with each factor, we may be able to build a resilient, technologically adept, and globally competitive workforce.

IDENTIFYING PLAUSIBLE FUTURES THROUGH THE FUTURES TRIANGLE

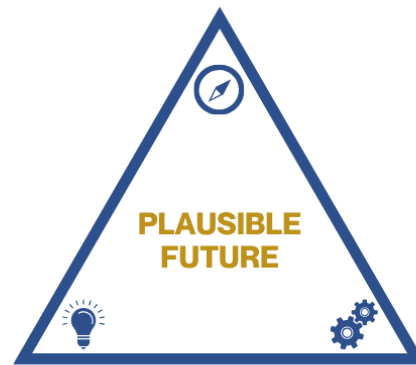
Possible future scenarios are determined using the Futures Triangle, a method for analyzing the dynamics between the past, present, and desired future. To identify the possible futures of health professions education, the *pushes of the present*, the *weight of history*, and the *pulls from the future* must be considered. *Pushes of the present* come from key factors identified through environmental scanning and scored based on impact, uncertainty, relevance, and impact. The *weight of history* includes the factors resulting from the current causal layered analysis (CLA) (Table 3.1). The *pulls of the future* encompass the results of the transformed CLA (Table 3.1). Figure 3.1 in the following page illustrates the Futures Triangle.

PULLS FROM THE FUTURE

- Look at the results of the **TRANSFORMED CLA** - this could represent your desired future

PUSHES OF THE PRESENT

- Put the 2-10 key factors identified from your **ENVIRONMENTAL SCANNING** here



WEIGHT OF HISTORY

- Look at the results of the **CURRENT CLA** - they could tell you the weights of the history.

Figure 3.1. Plausible Futures Triangle. Copyright 2024. UP NCPAG Governance Futures Lab, UP Manila

The following factors derived from environmental scanning and CLA were used to envision possible health professions education scenarios.

Pulls from the Future

- What do we wish for
 - Education that is responsive and dynamic; global classroom
 - Education funding at least 4% of GDP
 - Teachers receive adequate organizational and infrastructural support
 - Improved basic education
- What do we want to avoid?
 - Stagnant, irrelevant curriculum in UP Manila
- What are the compelling images of the future?
 - Education that is motivating, relevant, and engaging to students
 - Education that responds to the needs of the learners and the clients (patients)

Pushes of the Present

- Rapidly changing learner demographics (learning goals or preferred careers [e.g., arts over STEM], preferred learning modes [e.g., online vs. in-person], etc.)
- Increasing demand for “multi-skilled” and agile professionals - National Human Resources for Health Master Plan 2020-2040
- Emerging models of education delivery
- Government prioritization of education (budget allocation)
- Curriculum approval process
- Unstable geo-political landscape

Weight of History

- What is holding us back?
 - Education not evolving as quickly as changes in the demographics of learners
 - Teacher is overburdened with multiple responsibilities
- What are the barriers to change?
 - Difficult to incorporate innovations in the curriculum due to cost and access issues

- Multiple bureaucratic layers of approval before instituting curricular changes or procuring equipment; insufficient funding and not a priority by the government
 - Vulnerability of educational processes, etc. to natural and man-made disasters
 - Geo-political landscape has always been unstable
- What are the deep structures that resist change?
 - Government not prioritizing education
 - Conservatism (respect for traditions and rules)
 - Traditional perspectives and practices in education

SCENARIO BUILDING

Key assumptions about the future were made for each factor based on the analysis of the Futures Triangle to aid in building four possible scenarios: Business-as-Usual, Preferred, Disowned, and Integrated (see Table 3.4). A *business-as-usual* scenario refers to a possible future when no further actions are taken to manage the issue. A *preferred* scenario represents the best-case or ideal scenario wherein the issue is managed favorably considering all factors. A *disowned* scenario is the opposite of the preferred scenario involving an uncomfortable and undesirable situation resulting from a mismanaged issue. An *integrated* scenario is a combination of the preferred and disowned scenarios wherein an ambitious yet realistic future is imagined.

Table 3.4. Key assumptions per select factor.

Factor	Business-as Usual	Disowned	Preferred	Integrated
Rapidly changing learner demographics (learning goals or preferred careers, preferred learning modes)	Programs continue to be on “reactive” mode to address and adjust to learner needs; institution operates according to current demand/circumstance s; program outcomes are met	Irrelevant, resistant-to-change, and outdated programs; decreasing interest; program outcomes are not met	Dynamic, agile, flexible programs; institution actively recruits and easily attracts potential students regardless of their interests; program outcomes are met and students recognize the value of their education in addressing health needs of the country	Dynamic, agile, flexible programs that help learners achieve program outcomes but do not necessarily translate to increased human resource for health (i.e., students still choose to take a different path or profession)
Increasing demand for “multi-skilled” and agile professionals	Provide profession-specific training to build skills needed to function in typical/usual healthcare settings and scenarios	Provide profession-specific training but graduates cannot function even in typical healthcare settings /scenarios	Provide training that enable graduates to anticipate and respond to changes in the health system, demonstrating openness to continuous learning and flexibility in assuming roles in a wide range of healthcare and non-healthcare settings	Provide profession-specific training to build skills needed to function in a wide range of healthcare scenarios (including uncommon, complex, and dynamic scenarios); graduates cannot easily function in non-healthcare settings

Emerging models of education delivery	Continues to use hybrid teaching strategies/modes and traditional qualification models (undergrad degrees -> postgrad); may not meet the needs of all learners; slowly adopts/explores other modes (usually what is trending); the education system is not resilient to disruptions	Continues to use traditional teaching and qualification models that do not meet the needs of the learners; poor implementation of new teaching models, if any (i.e., misaligned facilities/materials); graduates produced are incompetent or not well-equipped to join the actual workforce	Regularly explores various teaching-learning and qualification models; models implemented effectively cater to the needs and contexts of all learners ; the education system is flexible and resilient to disruptions; the “best” quality of learning is achieved; all graduates are highly-skilled/competent	Open to and regularly explores emerging models of teaching-learning and qualification, but adopted models may not always be effective for all learners’ needs and contexts; the education system is flexible but is still not resilient to disruptions; most graduates are highly-skilled/competent
Unstable geopolitical landscape	Continues to be reactive to the current political landscape.	Global conflicts are widespread and continuously disrupt different areas of society. Education is not a priority of the government and people. Poor education standards and traditional approaches to teaching-learning continue.	Effectively anticipates the changes in the geopolitical landscape, enabling education to thrive in spite of conflicts and disruptions.	Continues to be reactive and adaptive to the changing political landscape; education still working towards advancement albeit slowly given the low resource afforded to it
Government prioritization of education (budget allocation)	Education budget is barely sufficient . Teachers are fairly compensated. Some resources are available, but cutting edge, costly resources are unavailable. Classrooms have modest improvements but lack important features to allow flexible learning modes	The government recognizes the critical role of education in nation building. Education budget is at an all-time high , leading to well-compensated teachers, adequate educational resources, classrooms have updated, state of the art equipment that allow flexible learning modes (physical, virtual, hybrid)	Education budget is at an all-time low . Teachers are poorly compensated. Resources needed by students are inaccessible due to high cost. Classrooms are outdated and non-conducive to flexible learning modes.	Budget for education modestly increased . Teachers are compensated well. Most educational resources are available for learners. Classrooms have the essential equipment needed to allow flexible learning modes.

Curriculum approval processes	Curricular changes continue to require approval of multiple layers of the administration, with each step requiring long processes of review and revision	Curricular changes are instituted in a timely manner, adapting to the rapidly changing needs of the healthcare landscape of the Philippines. Teachers are provided support (resources, capacity, administrative support) to update and refine the current curriculum	Curricular changes are more difficult, with more documentary requirements prior to approval of each administrative office	Modest improvement in the turnaround time of curricular change review, but the process still requires multiple rounds of revisions and approval
-------------------------------	---	---	--	---

Scenarios constructed based on the key assumptions from Table 3.4 are described in detail in the next sections.

Business-as-Usual

UP Leading the Way, Sort of

UP Manila remains to be the **leading health sciences center** and continues to influence other HEIs. However, funding has significantly decreased due to diluted resource allocation, which results in teaching facilities and services still not at par with or better than universities from developed countries. Traditional qualification models are still existing and despite openness to alternative models, UP is **slow to adapt**. Bureaucracy in curricular development and approval processes continues to impede the timely implementation of new and revised curricula. Health professions education adopts modular and blended modes of delivery due to climate/weather disturbances and traffic/population congestion. **Technology is adopted in education systems**, expanding the opportunities for learning and augmenting educators' capacity to deliver content. Health professions education is highly specialized and is driven by the specific needs and requirements of employers. There is no universal access to inclusive education yet. Curricula are future-oriented focusing on skills relevant to the future healthcare needs with a high emphasis on STEM and emerging technologies education. Learning is modular- and project-based where students work on real-world problems and globally collaborate with peers from other specialties and fields worldwide (global classroom).

Preferred Future

Universal Utopian UP

The country has **adequate resources** (economic, manpower, technological, etc.) and has a supportive environment for the growth of its sectors, including health and education. AI and technology are harnessed and exploited by Filipinos to solve the problems of the country and the world. Health care is equitable and preventive and the results of advanced health research via gene editing and gene therapy have virtually eradicated illnesses and significantly

lengthened the expected lifespan of the population. The government recognizes the critical role of education in nation-building. Despite geopolitical uncertainties, UP Manila thrives and effectively advocates for adequate resources. Funding for education adequately supports the needs of stakeholders to implement the best education models. As an **internationally recognized institution, UP Manila** fosters healthcare leaders and shapes the narrative and direction of Philippine healthcare education. UP Manila also offers **dynamic, agile, flexible programs** that produce “multi-skilled”, competent graduates who can anticipate and respond to changes in the health system. There is also universal access to inclusive education. Various teaching-learning and qualification models are implemented that cater to the needs of all learners. Curricular changes are instituted promptly, adapting to the rapidly changing needs of the healthcare landscape of the Philippines. Teachers are provided support (resources, capacity, administrative support) to update and refine the current curriculum.

Disowned Future

Big Brother (G. Orwell’s 1984)

Global conflicts, healthcare crises, and climate issues are widespread and continuously disrupt different areas of society. The main concern of the population is basic survival and competition for resources. The **education budget is at an all-time low** leading to decreased education standards. Schools and universities in the country (UP included) **struggle to keep up with the times and maintain their academic freedom**. Curricular processes require more documentary requirements and rounds before approval. Learners have difficulties achieving learning outcomes due to conflicting priorities, personal struggles, and suboptimal education standards. This leaves **graduates unprepared** to function even in typical healthcare scenarios/settings.

Integrated Future

Better UP, Subpar Human Resource for Health

The UP Manila education system has made substantial strides towards modernization, transforming its educational system through advancements in technology, inclusivity, and shifts in the needs of the society and the nation. The University continues to set academic standards for other HEIs. Through the **integration of technology, a future-oriented curriculum, and ongoing support for educators**, the country is better equipped to prepare students for the challenges, opportunities, and demands of the future while addressing inequalities/inequities. Education is universally free and is specialized and guided by actual healthcare needs. The education sector has evolved to meet the demands of a rapidly changing world while striving to provide equitable opportunities for all. However, challenges remain in ensuring that all students benefit from these advancements and that their education translates to a better and adequate health workforce in the Philippines. While **graduates may be proficient, they do not necessarily pursue careers in health care or choose to seek opportunities abroad**. Emphasis on work-life balance is also lacking.

BACKCASTING THE PREFERRED FUTURE AND ROADMAP OF THE FUTURES OF EDUCATION OF THE HEALTH WORKFORCE IN THE UNIVERSITY OF THE PHILIPPINES MANILA BY 2058

Backcasting involves defining how the desired or preferred future is attained, identifying the actions and milestones necessary to facilitate achievement of the strategic goal.

The future of health workforce education at UP Manila aims to produce multi-skilled, future-ready, responsive graduates. UP Manila stands as an internationally recognized education provider, shaping the future of healthcare leadership. These multi-skilled, adaptable, and globally competitive graduates contribute to the advancement of healthcare, education, and policy both in the Philippines and internationally. Education at UP Manila is dynamic, agile, and accessible to all, effectively responding to the nation's health needs while setting global standards. This strategic goal is set for 2058, 50 years from the year 2008 (the University's 100th foundation anniversary).

To guide the planning approach, backcasting was done for each 10-year period from 2058 until present time. Objectives and specific action points were set, and key milestones were determined as indicators of success.

Strategic Goal: Foundational Enhancements

Horizon and Phase 1: 2024-2028

Milestones:

- Faculty development and training investments in the areas of teaching, research, and service are launched.
- Regular and efficient curriculum review process institutionalized.
- Benchmarking activities and discussions with regulatory bodies conducted to explore and negotiate the implementation of various education and professional qualification models
- Pilot curricula integrating artificial intelligence (AI) and advanced technology initiated.
- Official lobbying efforts for increased education funding initiated.

Strategic Goal: Strengthening Innovation and Infrastructure

Horizon and Phase 2: 2029-2033

Milestones:

- Curriculum upgrades aligned with local, regional and global standards.
- Technologically advanced classrooms and simulation laboratories implemented across colleges.

- Enhance national and international academic partnerships for agile and responsive programs.
- Faculty training on emerging healthcare technologies and innovative teaching expanded.
- Official proposal for significant % GDP allocation to UP Manila submitted to Congress.

Strategic Goal: Expansion and Institutionalization

Horizon and Phase 3: 2034-2038

Milestones:

- UP Manila is recognized as a leader in integrating advanced technology in healthcare education.
- Centers of Excellence in biotechnology, public health, digital healthcare education and research established.
- AI and emerging technologies fully integrated into classroom and clinical teaching.
- Government partnerships secured to support inclusive, flexible learning environments.
- Collaboration with other universities and government agencies in the Philippines on advancing agile health professions education formalized.

Strategic Goal: National and Global Influence

Horizon and Phase 4: 2039-2048

Milestones:

- UP Manila obtains international accreditation as a world-class educational institution.
- Advanced interdisciplinary curriculum integrating healthcare leadership, management, and technology fully adopted.
- Education funding at least 4% of GDP secured through government lobbying.
- Multi-skilled, agile graduates increasingly fill critical roles in the Philippine healthcare system.
- Universal access to education significantly expanded with government-supported flexible learning models.

Strategic Goal: UP Manila as a Global Leader in Healthcare Education

Horizon and Phase 5: 2049-2058

Milestones:

- UP Manila consistently ranks in the top 100 among internationally recognized institutions for healthcare education.
- All geographical regions are consistently well-represented in the student body of UP Manila.

- More than 80% of UP Manila graduates work within the Philippine health system or sectors that contribute to addressing national and global health needs.
- Sustainable funding models secured for continuous curriculum and faculty advancement aligned with UP Manila's leadership role in education.
- Philippine healthcare professionals are globally competitive and sought after in both local and international institutions.
- Equitable and preventive healthcare become the norm and fully integrated with the universal health care program
- UP Manila-trained leaders shaping national, regional, and global health policies.

Final Vision (2058 and Beyond)

UP Manila stands as an internationally recognized education provider, shaping the future of healthcare leadership. Through the provision of dynamic, agile and accessible education, UP Manila effectively responds to the nation's health needs while setting global standards.

A graphical summary of the roadmap of the futures of education of the health workforce in UP Manila by 2058 is shown in Figure 3.2.

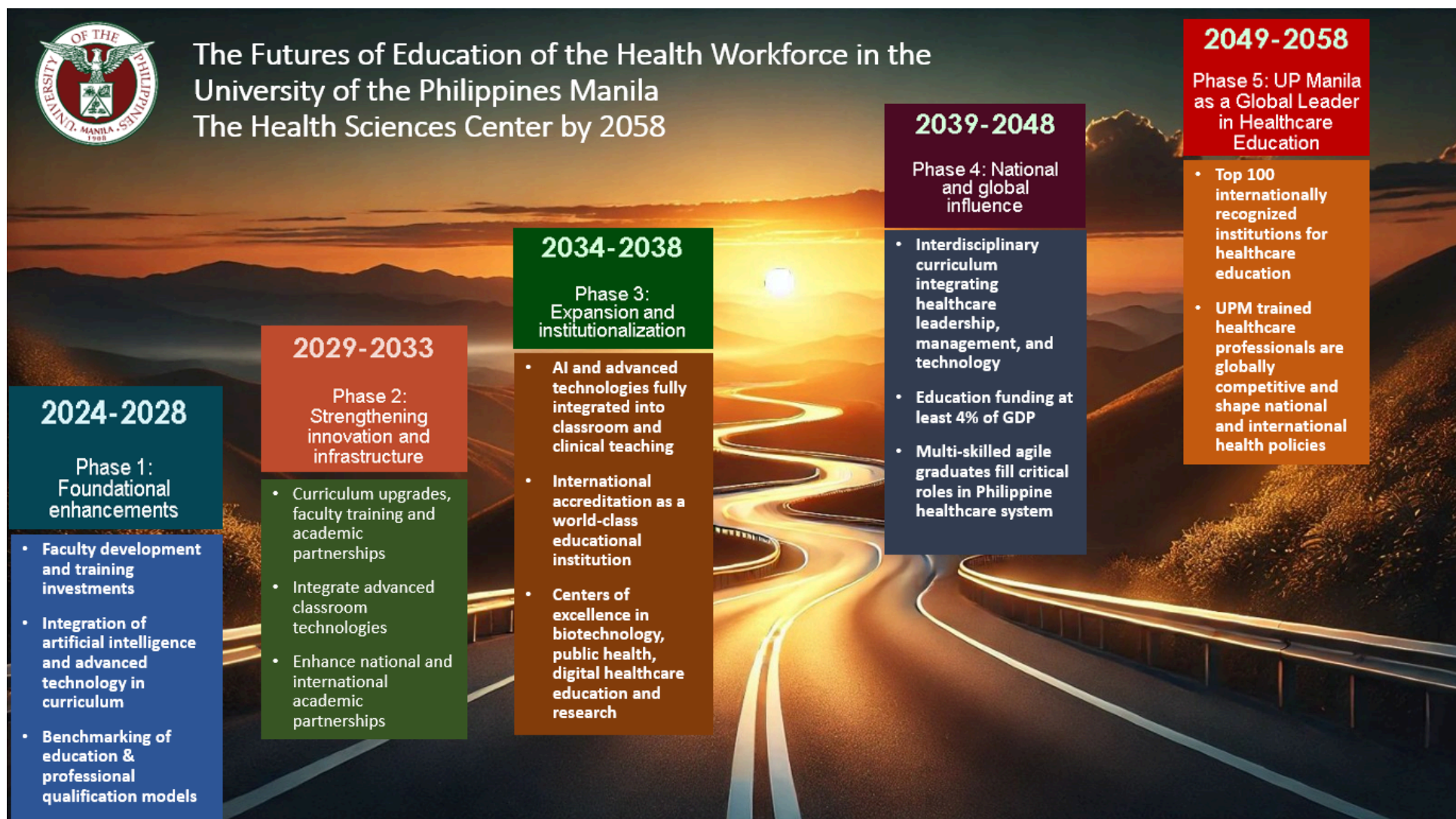


Figure 3.2. Roadmap of the futures of education of the health workforce in UP Manila by 2058.

EPILOGUE

Dr. Emerito Jose A. Faraon, MD, MBA
Director, Research Management and Translation
University of the Philippines Manila



The Future is What We Make It (Not Just What Happens)

As we conclude this exhilarating journey into the future of Philippine health systems, one thing is crystal clear: the road ahead will not be a joyride in a DeLorean, where we simply punch in 2058 and arrive. We've mapped out key destinations – integrated digital systems, resilient healthcare education, and a future-ready workforce – and now, the real adventure begins! Achieving this extraordinary future demands more than just whimsical visions of flying cars and instant healing. It requires a fierce commitment to digital literacy, the forging of a robust infrastructure, unwavering ethical stewardship of data, and the unstoppable force of political will.

Together, we have discovered a fundamental truth: the future of health is not some passive, pre-written destiny. It is a high-stakes drama shaped by the choices we forge in the fires of today. So, let us power down our flux capacitors with purpose, returning to the present armed with the critical coordinates for a brighter tomorrow: unyielding health equity, groundbreaking digital innovation, and a dynamic, responsive health workforce. These are not mere buzzwords; they are the rocket fuel that will propel us towards a healthier future for every Filipino. Let us seize the initiative, grab the wheel with unwavering resolve, and as wise time travelers come up with a BETTER motto: “We are not just time travelers on a joyride; we are architects of tomorrow, building a legacy that will echo through the ages. The glorious future will never be handed to us; it is a monument we construct, brick-by-painstaking-brick. Let us lay a foundation so magnificent, future generations will envy the era from which it sprung.”

REFERENCES

- Ablao, C. J., Diaz, D. C., & Macapagal, J. (2022). Challenges of distance education assessment in the health professions during the COVID-19 pandemic: A Philippine reflection in the rapid review of international context. *Acta Medica Philippina*, 56(8), 49-57.
- Agaton C & Karl H. Real options approach to renewable electricity generation in the Philippines. *Energy, Sustainability and Society* (2018) 8:1. DOI 10.1186/s13705-017-0143-y <https://fma.ph/resources/resources-gender-ict/social-media-and-privacy-the-philippine-experience/>
- Ahmad, S. S., Mat Seman, M. A., & Zakaria, A. (2021). The challenges faced by educators in online teaching during the COVID-19 pandemic outbreak. *Journal of English Teaching Adi Buana*, 6(2), 125-133.
- Ahmed MS, Soltani A, Zahra D, et al. Remote online learning reimaged: Perceptions and experiences of medical students in a post-pandemic world. *BMC Med Educ*. 2025;25(1):215. doi:10.1186/s12909-025-06815-6
- Ahmed, S. Z., Sultan, S., Kousar, M., Basit, H. A., Zaid, R., & Bano, S. (2022). Effectiveness of teacher's centered approach on student's learning at university level. *Journal of Positive School Psychology*, 6(10), 415-428.
- Alami H, Lehoux P, Fleet R, et al. How can health systems better prepare for the next pandemic? Lessons learned from the management of COVID-19 in Quebec (Canada). *Front Public Health*. 2021;9:671833. doi:10.3389/fpubh.2021.671833
- Ann S. Number of students suffering from mental health issues growing. ABS-CBN. January 31, 2023 Jan 31. Accessed March 26, 2025. <https://www.abs-cbn.com/spotlight/01/31/23/number-of-students-suffering-from-mental-health-issues-growing>
- Asian Development Bank. (2020). Futures Thinking in Asia and the Pacific: Why Foresight Matters for Policy Makers. <https://www.adb.org/publications/futures-thinking-asia-pacific-policy-makers>
- Association of Southeast Asian Nations. ASEAN Mutual recognition arrangement on medical practitioners. Association of Southeast Asian Nations; 2009. Accessed March 26, 2025. <https://asean.org/asean-mutual-recognition-arrangement-on-medical-practitioners/>
- Bautista, M. C. R., & Aranas, M. V. P. (2023). The learning crisis in Philippine education: An overview. *EDCOM 2 Policy Notes*, No. 2023-17 (July 2023).
- Bell, W. (2004). *Foundations of futures studies: Volume 1: History, purposes, and knowledge* (2nd ed.). Routledge.
- Beltran BB. Tracking the progress of healthcare in PHL. *Business World*. May 17, 2024. Accessed March 26, 2025.

<https://www.bworldonline.com/special-features/2024/05/17/595825/tracking-the-progress-of-healthcare-in-phl/>

Cardoz KM. UP's pandemic response: Activities, programs, and policies implemented by the University of the Philippines in response to the COVID-19 pandemic. University of the Philippines Center for Integrative and Development Studies; 2022. Accessed March 26, 2025.

<https://cids.up.edu.ph/wp-content/uploads/2023/01/UPs-Pandemic-Response-Activities-Programs-and-Policies-Implemented-by-the-University-of-the-Philippines-in-Response-to-the-COVID-19-PandemicPandemic.pdf>

Car LT, Poon S, Kyaw BM, et al. Digital education for health professionals: An evidence map, conceptual framework, and research agenda. *J Med Internet Res.* 2022;24(3):e31977. doi:10.2196/31977

Chi C. How budget cuts could worsen the battle for spots in tuition-free universities. *Philstar.* September 28, 2023. Accessed March 26, 2025. <https://www.philstar.com/headlines/2023/09/28/2299682/how-budget-cuts-could-worsen-battle-spots-tuition-free-universities>

Clark, P. F., Stewart, J. B., & Clark, D. A. (2006). The globalization of the labour market for health-care professionals. *International Labour Review*, 145(12), 37-64.

Crispino, K. T., & Rocha, I. C. N. (2021). Enhancing healthcare professional practice in the Philippines toward ASEAN integration through the Continuing Professional Development Law. *ASEAN Journal of Community Engagement*, 5(2), 376-395.

Conforti, R. (2025). Informatics in emergency medicine: A literature review. *Emerg Care Med*, 2(1), 2. <https://doi.org/10.3390/ecm2010002>

Dalanon J, Matsuka Y. Forecasting interest in health professions education based on relative search volume trends from the Philippines. *Health Prof Educ.* 2020;6(3):368-375. doi:10.1016/j.hpe.2020.04.010

Davies, H., Gallagher, O., Cole, A., Crevacore, C., Kang, E., & Jutsum, K. (2024). Nursing and medical students' views before and after participation in a simulated ward-based interprofessional learning activity: An exploratory study. *Clinical Simulation in Nursing*, 97, 101632.

Dayagbil, F. T., Palompon, D. R., Garcia, L. L., & Olvido, M. M. J. (2021). Teaching and learning continuity amid and beyond the pandemic. *Frontiers in Education*, 6, 678692. <https://doi.org/10.3389/feduc.2021.678692>

Dayapera LZ, Sy JC, Valenzuela S, et al. One health in the Philippines: A review and situational analysis. *One Health.* 2024;18:100758. doi:10.1016/j.onehlt.2024.100758

DBM supports salary increase of govt. workers; Study for possible salary adjustment for govt workers, to be completed within the first half of 2024. Press release. Department of Budget and Management. May 7, 2024. Accessed March 26, 2025.

- <https://www.dbm.gov.ph/index.php/management-2/2778-dbm-supports-salary-increase-of-govt-workers-study-for-possible-salary-adjustment-for-govt-workers-to-be-completed-within-the-first-half-of-2024>
- Deakin University. (n.d.). Principles for inclusion in health professions education. <https://blogs.deakin.edu.au/iccb/toolkit/health-professions-education/>
- Dedeilia, A., Papapanou, M., Papadopoulos, A. N., et al. (2023). Health worker education during the COVID-19 pandemic: Global disruption, responses and lessons for the future—a systematic review and meta-analysis. *Human Resources for Health*, 21, 13. <https://doi.org/10.1186/s12960-023-00799-4>
- Del Castillo, M. F. P., Fujimi, T., & Tatano, H. (2024). Estimating sectoral COVID-19 economic losses in the Philippines using nighttime light and electricity consumption data. *Frontiers in Public Health*, 12, 1308301. <https://doi.org/10.3389/fpubh.2024.1308301>
- Del Valle, J. L. (2020). Learner-centered acts of 'academic care' within the practice of teacher-centered instruction of rural teachers in Bicol. *BU R&D Journal*, 23(2), 55-63.
- Del Valle, J. H. (2022). Tough Teachers Actually Care: An Ethnographic Look into the 'Problematic' Role of Teachers as Figures of Authority Under Learner-Centered Education. *Australian Journal of Teacher Education*, 47(6). <https://doi.org/10.14221/ajte.2022v47n6.2>
- Department of Education - Philippines. (2021). The need for climate change education. <https://www.deped.gov.ph/climate-change-education/cce-in-the-philippines/>
- Edgar, A. K., Tai, J., & Bearman, M. (2024). Inclusivity in health professional education: How can virtual simulation foster attitudes of inclusion? *Advances in Simulation*, 9, 15.
- Eid-Heberle K, Burt S. Disaster education in the nursing curriculum: Embracing the past, learning from the present, preparing for the future. *J Radio Nurs*. 2023;42(2):155–161. doi:10.1016/j.jradnu.2022.10.005
- Feigerlova, E., Hani, H., & Hothersall-Davies, E. (2025). A systematic review of the impact of artificial intelligence on educational outcomes in health professions education. *BMC Medical Education*, 25(1), 129. <https://doi.org/10.1186/s12909-025-06719-5>
- Fowler, J. (2021). Over 1M records from NBI, PNP, other agencies leaked in massive databreach. *Inquirer News*. Retrieved from <https://newsinfo.inquirer.net/over-1m-records-leaked>
- Genuino KF, Ma J, Dizon PM. Comparison of faculty and student evaluations of the hybrid teaching of orthopedics during the COVID-19 pandemic. *PJHRD*. 2023;27(3):1–8. Accessed March 26, 2025. <https://pjhrd.upm.edu.ph/index.php/main/article/view/704/373>
- GMA Integrated News. (2024). DepEd: Over 377K students 'very high risk' to further learning losses due to class suspensions. <https://www.gmanetwork.com/news/topstories/nation/926910/deped-class-suspensions-education/story/>
- Godley F, Fer D, Patel AD, Paranjape C. Remote robotic surgery: Implementing a technology 20 years in the making. *Surg Endosc*. 2025;39:2743–7. doi:10.1007/s00464-025-11604-9

- Gomez, L. E., & Bernet, P. (2019). Diversity improves performance and outcomes. *Journal of the National Medical Association*, 111(4), 383-392.
- Guidelines on the implementation of telemedicine in the delivery of individual-based health services. Department of Health, Department of the Interior and Local Government, Philippine Health Insurance Corporation. May 19, 2021. Joint administrative order no. 2021-0001. Accessed March 26, 2025. <https://law.upd.edu.ph/wp-content/uploads/2022/06/DOH-DILG-PHIC-Joint-Administrative-Order-No-2021-0001.pdf>
- Hamzah HA, Abu Seman MS, Ahmed M. The impact of artificial intelligence in enhancing online learning platform effectiveness in higher education. *Inf Dev*. Published online February 13, 2025. doi:10.1177/02666669251315842
- Hebebcı, M. T. (2023). The impact of natural disasters on education. *International Conference on Social Science Studies (IConSoS)*, April 27-30, 2023.
- Hill, H., & Menon, J. (2010). ASEAN economic integration: Features, fulfillments, failures and the future. *ADB Working Paper Series on Regional Economic Integration*, No. 69. <https://asean.org/our-communities/economic-community/>
- Ho YP, Reddy PM. Identification of pathogens by mass spectrometry. *Clin Chem*. 2010;56(4):525–536. doi: 10.1373/clinchem.2009.138867
- How will healthtech startups in the Philippines evolve competitively?. *Tech Collective*. February 21, 2025. Accessed March 26, 2025. <https://techcollectivesea.com/2025/02/21/healthtech-startups-philippines-evolve/>
- Human Resources for Health 2030 Consortium. Human resources for health in 2030 in the Philippines. Human Resources for Health 2030 Consortium; 2020. Accessed March 26, 2025. <https://hrh2030program.org/wp-content/uploads/2021/01/USAIDs-HRH2030-Philippines-Final-Report.pdf>
- Human Resources for Health 2030 Consortium. Improving health workforce planning and management. Human Resources for Health 2030 Consortium; 2020. Accessed March 26, 2025. https://hrh2030program.org/wp-content/uploads/2020/08/2.5_HRH2030PH-Policy-Brief-WISN.pdf
- Human Resources for Health 2030 Consortium, USAID, Department of Health. Human resources for health migration. Human Resources for Health 2030 Program; 2020. Accessed March 26, 2025. https://hrh2030program.org/wp-content/uploads/2020/08/2.5_HRH2030PH-Policy-Brief-WISN.pdf https://hrh2030program.org/wp-content/uploads/2020/08/x12.8_HRH2030PH-Migration-policy-brief.pdf

- Human Resources for Health 2030 Consortium, USAID, Department of Health. Human resources for health migration. Human Resources for Health Philippine Masterplan 2020-2040. Human Resources for Health 2030 Consortium; 2020. Accessed March 26, 2025. https://hrh2030program.org/wp-content/uploads/2020/08/2.5_HRH2030PH-Policy-Brief_WISN.pdfhttps://hrh2030program.org/wp-content/uploads/2020/08/x12.8_HRH2030PH_Migration-policy-brief.pdf
- Huynen, M. M., Martens, P., & Hilderink, H. B. (2005). The health impacts of globalisation: A conceptual framework. *Global Health*, 1, 14. <https://doi.org/10.1186/1744-8603-1-14>
- How leadership transitions affect the education sector. *Philippine Daily Inquirer*. July 31, 2024. Accessed March 26, 2025. <https://opinion.inquirer.net/175623/how-leadership-transitions-affect-the-education-sector>
- Inayatullah, S. (2019). Causal Layered Analysis A Four-Level Approach to Alternative Futures Relevance and Use in Foresight. *Futuribles*. https://www.researchgate.net/publication/332706079_Causal_Layered_Analysis_A_Four-Level_Approach_to_Alternative_Futures_RELEVANCE_AND_USE_IN_FORESIGHT
- Inayatullah, S. (2023). The Futures Triangle: Origins and iterations. *Futures*, 15(2-4). <https://doi.org/10.1177/19467567231203162>
- ION Professional eLearning Program. (n.d.). Strengths and Weaknesses of Online Learning University of Illinois Springfield. ION Resources. <https://www.uis.edu/ion/resources/tutorials/overview/strengths-weaknesses>
- Jayachandran, S. (2015). Chapter 5: Governance challenges in education and health care in developing countries. In S. Asefa & W.-C. Huang (Eds.), *The political economy of good governance* (pp. 93-110). W.E. Upjohn Institute for Employment Research.
- Jha et al, 2018. NATURAL DISASTERS, PUBLIC SPENDING, AND CREATIVE DESTRUCTION: A CASE STUDY OF THE PHILIPPINES.
- Kämpfen F, Wijemunige N, Evangelista B. Aging, non-communicable diseases, and old-age disability in low- and middle-income countries: A challenge for global health. *Int J Public Health*. 2018;63(9):1011–1012. doi:10.1007/s00038-018-1137-z
- Kecorius S, Tamayo EG, Galvez MC, et al. Activity pattern of school/university tenants and their family members in Metro Manila – Philippines. *Aerosol Air Qual Res*. 2018;18:2412-2419. doi:10.4209/aaqr.2018.02.0069
- Khalili, H., Lackie, K., Langlois, S., Wetzlmair, L. C., & Working Group. (2022). Global IPE situational analysis result final report. InterprofessionalResearch.Global Publication. <https://www.interprofessionalresearch.global>
- Khuntia, J., Ning, X., Cascio, W., & Stacey, R. (2022). Valuing diversity and inclusion in health care to equip the workforce: Survey study and pathway analysis. *JMIR Formative Research*, 6(5), e34808. <https://doi.org/10.2196/34808>

- KonsultaMD group seen to help government delivery of primary care. Globe. September 2, 2022. Accessed March 26, 2025. <https://www.globe.com.ph/about-us/newsroom/partners/konsultamd-group-seen-help-go-vt-delivery-primary-care#gref>
- Kreitlow A, Steffens S, Jablonka A, Kuhlmann E. Support for global health and pandemic preparedness in medical education in Germany: Students as change agents. *Int J Health Plann Manage*. 2021;36(S1):112–123. doi:10.1002/hpm.3143
- Li, S. (2024). Immersive technologies in health professions education: A bibliometric analysis. *Computers & Education: X Reality*, 4, 100051. <https://doi.org/10.1016/j.cexr.2024.100051>
- Lorenc T, Oliver K. Adverse effects of public health interventions: a conceptual framework. *J Epidemiol Community Health*. 2014 Mar;68(3):288-90. doi: 10.1136/jech-2013-203118. Epub 2013 Dec 13. PMID: 24336237.
- Lucey, C. R., & Johnston, S. C. (2020). The transformational effects of COVID-19 on medical education. *JAMA*, 324(11), 1033–1034. <https://doi.org/10.1001/jama.2020.14136>
- Maca, M., & Morris, P. (2012). The Philippines, the East Asian 'developmental states' and education: A comparative analysis of why the Philippines failed to develop. *Compare: A Journal of Comparative and International Education*, 42(3), 461-484.
- Macagba, E. (2023). Filipino nursing schools: Export of healthcare workers. <https://wp.nyu.edu/berlinblog/filipino-healthcare-workers/>
- MGH Institute of Health Professions. (2025). Integrating Technology in Health Professions Education: Trends and Innovations. <https://www.mghihp.edu/news-and-more/opinions/health-professions-education-effects/integrating-technology-health-professions-education-trends-and-innovations>
- Majumdar, S. (2024). Book review: S. Dutta, B. Lanvin, L. Rivera León, & S. Wunsch-Vincent (Eds.), *Global Innovation Index 2024: Unlocking the Promise of Social Entrepreneurship*. *The Journal of Entrepreneurship*, 33(4), 940-944. <https://doi.org/10.1177/09713557241309486>
- Natural disasters in the Philippines - statistics & facts. Retrieved online from: <https://www.statista.com/topics/5845/natural-disasters-in-the-philippines-at-a-glance/#topicOverview> [February 15, 2025].
- Ngaya-an, F., De Torres, R. Q., Peralta, A. B., & Tuazon, J. A. (2024). Status of interprofessional education (IPE) in Asian nursing schools. *Acta Medica Philippina*, 58(12), 70-77.
- Peterson Institute for International Economics. (2014). What is globalization? And how has the global economy shaped the United States? <https://www.piie.com/microsites/globalization/what-is-globalization>
- PH economy maintained steady growth in 2024 despite challenges; outlook for 2025 remains bullish driven by lower inflation, higher consumption, and investments. News release. Department of Finance. January 30, 2025. Accessed March 26, 2025.

<https://www.dof.gov.ph/ph-economy-maintained-steady-growth-in-2024-despite-challenges-outlook-for-2025-remains-bullish-driven-by-lower-inflation-higher-consumption-and-investments/>

- Pokhrel S, Chhetri R. A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*. 2021;8(1):133–141. doi:10.1177/2347631120983481
- Ramachander A, Gowri DP, Selvi S. The future of digital health in transforming healthcare. In: Tong R, Ganesan B, eds. *Digital Technology in Public Health and Rehabilitation Care*. Academic Press; 2024:363–385. doi:10.1016/B978-0-443-22270-2.00021-6
- Rao P. 2019. *Inventure Business Adviser LLP*. Retrieved online from: https://ppp.gov.ph/wp-content/uploads/2019/03/PPPC_HealthForum-PPPs-Role-PRa_o.pdf [February 15, 2025].
- Regional accounts of the Philippines. News release. Philippine Statistics Authority. April 25, 2024. Accessed March 26, 2025. <https://psa.gov.ph/statistics/regional-accounts>
- Robiños, J. R., & Alcazaren, H. K. (2023). Internationalization towards fostering a school culture of quality: Practices and perceived impact. *Philippine Journal of Education Studies*, 1(1), 85–109.
- Robredo JP, Ong B, Eala MA, Naguit RJ. Outmigration and unequal distribution of Filipino physicians and nurses: An urgent call for investment in health, human resource and systemic reform. *Lancet Reg Health West Pac*. 2022;25:100512. doi:10.1016/j.lanwpc.2022.100512
- Romero J. System needs to change to improve health quality in PH hospitals, study shows. Philippine Institute for Development Studies. June 24, 2022. Accessed March 26, 2025. <https://pids.gov.ph/details/news/in-the-news/system-needs-to-change-to-improve-health-quality-in-ph-hospitals-study-shows>
- Sack J, Nieves B. Labster. *Am Biol Teach*. 2023;85(1):55. doi:10.1525/abt.2023.85.1.55
- Samson M. What Filipino doctors must know about paying taxes. *Taxumo*. October 12, 2023. Accessed March 26, 2025. <https://www.taxumo.com/blog/what-filipino-doctors-must-know-about-paying-taxes/>
- Sangfor Technologies. (2024). Jollibee data breach in the Philippines affected 11 million customers. Retrieved from <https://www.sangfor.com/blog/cybersecurity/jollibee-data-breach>
- Saguin, K. I. (2019). Designing effective governance of education. *Policy Design and Practice*, 2(2), 182–197.
- Sahu, P. K., & Dalçik, H. (2023). Editorial: Impact of COVID-19 on healthcare professions education. *Frontiers in Medicine*, 10, 1265811.
- Schambach A, Buchholz CJ, Torres-Ruiz R, et al. A new age of precision gene therapy. *The Lancet*. 2024;403(10426):568–582. doi:10.1016/S0140-6736(23)01952-9

- Segouin, C., Hodges, B., & Brechat, P. H. (2005). Globalization in health care: Is international standardization of quality a step toward outsourcing? *International Journal for Quality in Health Care*, 17(4), 277-279.
- Seposo X, Valenzuela S, Apostol LC, Wangkay KA, Lao PE, Enriquez AB. Projecting temperature-related dengue burden in the Philippines under various socioeconomic pathway scenarios. *Front Public Health*. 2024;12(1420457). doi:10.3389/fpubh.2024.1420457
- Serrano IMA, Cuyugan AMN, Cruz K, Mahusay JMA, Alibudbud R. Sociodemographic characteristics, social support, and family history as factors of depression, anxiety, and stress among young adult senior high school students in Metro Manila, Philippines, during the COVID-19 pandemic. *Front Psychiatry*. 2023;14:1225035. doi:10.3389/fpsy.2023.1225035
- Shashidhara, Y. N., Siva, N., Ladd, E., Ramachandran, S., Nayak, B. S., & Velayudhan, B. (2024). Perceived interprofessional learning readiness in healthcare profession: A cross-sectional study. *Health Professions Education*, 10(3), 9.
- Srivastava, P., Trinh, T.-A., & Zhang, X. (2022). Weather effects on academic performance: An analysis using administrative data. Discussion Papers, 2207, University of Exeter, Department of Economics.
- Stanford, F. C. (2020). The importance of diversity and inclusion in the healthcare workforce. *Journal of the National Medical Association*, 112(3), 247-249. <https://doi.org/10.1016/j.jnma.2020.03.014>
- Stevens, F. C. J., & Goulbourne, J. D. S. (2012). Globalization and the modernization of medical education. *Medical Teacher*, 34(10), e684–e689. <https://doi.org/10.3109/0142159X.2012.687487>
- Te, V., Griffiths, R., Law, K., Hill, P. S., & Annear, P. L. (2018). The impact of ASEAN economic integration on health worker mobility: A scoping review of the literature. *Health Policy and Planning*, 33(8), 957-965.
- Thalberg, A. (2019). Technology resistance: Helping administration stop it in our schools. *Culminating Projects in Information Media*, 24. https://repository.stcloudstate.edu/im_etds/24
- Trump shutting down USAID won't affect PH, says NEDA. Press release. Presidential Communications Office. February 10, 2025. Accessed March 26, 2025. https://pco.gov.ph/news_releases/trump-shutting-down-usaid-wont-affect-ph-says-neda/
- United Nations Department of Economic and Social Affairs. (2015). The Sustainable Development Goals. <https://sdgs.un.org/2030agenda>
- United Nations Disaster Risk Reduction. (2024). School's out: how climate change is already badly affecting children's education. <https://iddrr.undrr.org/news/schools-out-how-climate-change-already-badly-affecting-childrens-education#>

- Universal Health Care Act 2019 (Ph) s 3. Accessed March 26, 2025.
<https://www.officialgazette.gov.ph/2019/02/20/republic-act-no-11223/>
- University of the Philippines Resilience Institute. (2022). UP Resilience Institute Director Discusses Metro Manila as a Sinking City.
<https://resilience.up.edu.ph/up-resilience-institute-director-discusses-metro-manila-as-a-sinking-city/>
- World Bank Group. (n.d.). Social inclusion.
<https://www.worldbank.org/en/topic/social-inclusion>
- Veinot TC, Mitchell H, Ancker JS. Good intentions are not enough: how informatics interventions can worsen inequality. *J Am Med Inform Assoc*. 2018 Aug 1;25(8):1080-1088. doi: 10.1093/jamia/ocy052. PMID: 29788380; PMCID: PMC7646885.
- Villamonte J. Government nurses get pay hike spread over 4 years. *Daily Tribune*. October 21, 2024. Accessed March 26, 2025.
<https://tribune.net.ph/2024/10/20/govt-nurses-get-pay-hike-spread-over-4-years>
- Wajdi M, Susanto B, Sumartana IM, Sutiarto MA, Hadi W. Profile of generation Z characteristics: Implications for contemporary educational approaches. *KPSBSL*. 2024;1(1):33–44. doi:10.58881/kpsbsl.v1i1.8
- Yondu. (n.d.). 5 biggest data breaches in the Philippines. Retrieved from
<https://www.yondu.com/articles/5-biggest-data-breaches-in-the-philippines>
<https://philippines.unfpa.org/en/topics/young-people-19#:~:text=The%20Philippines%20today%20has%20the,percent%20of%20the%20Philippine%20population.>
- Zainal H, Hui XX, Thumboo J, Fong W, Yong FK. Patients' expectations of doctors' clinical competencies in the digital healthcare era: Qualitative semistructured interview study among patients. *JMIR Hum Factors*. 2024;11:e51972. doi:10.2196/51972
- Zhai C, Wibowo S, Li LD. The effects of over-reliance on AI dialogue systems on students' cognitive abilities: A systematic review. *Smart Learn Environ*. 2024;11(28):1–37. doi:10.1186/s40561-024-00316-7



COPYRIGHT

© 2025 University of the Philippines Manila
All Rights Reserved.