

The Effect of Clean Water, Sanitation, and Personal Hygiene on Strengthening Student Health among the Environmental and Sanitary Engineering Students of the National University Manila Academic Year 2022-2023

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Abstract: *Safe drinking water, sanitation, and hygiene (WASH) are critical to raising people's living standards, especially the youth and students. Excellent WASH has enabled the community to improve their standards such as greater physical health, environmental protection, better educational outcomes, time savings, the assurance of lives lived with dignity, and equal treatment for men and women. Nevertheless, sanitary and environmental engineering have a different perspective regarding WASH and it may apply to their professional career in the future. This study aims to identify the effect of clean water, sanitation, and personal hygiene on strengthening students' health among the environmental and sanitary engineering students of the National University Manila academic year 2022-2023.*

Keywords: *Clean Water, Sanitation, Hygiene, Health, Environmental, and Sanitary Students*

I. INTRODUCTION

Water is a necessity for all life on Earth. Pollution can contaminate a water source, causing health problems in humans such as cancer or cardiovascular disease. Water is known as the universal solvent because it dissolves more substances than any other liquid. However, because of this ability, water is easily polluted. Access to safe drinking water and adequate sanitation is a fundamental human right that underpins success in areas such as agriculture, energy, disaster resilience, human health, the environment, and, ultimately, economic growth.

The Philippines is one of the United Nations member nations that has committed to achieving the 17 Sustainable Development Goals (SDGs) by 2030 which involves providing everyone with universal and equal access to safe and inexpensive drinking water, sanitation, and hygiene (Reyes, C. et al., 2019). The SDGs are described as a “global call to action to end poverty, safeguard the planet, and ensure peace and prosperity for everyone.” [1]

Every person has the right to grow up in a clean and safe environment. Access to safe drinking water, basic toilets, and proper hygiene habits not only keeps people alive but also offers them a healthier start in life.

According to NEDA (2021), the Philippines has only 7.7 percent of the population having access to safe water and 73.8 percent to basic sanitation as of 2015, achieving the sectoral goals of 95.0 percent access to safe water and 97.0 percent access to basic sanitation by 2022, and universal access to WSS services by 2030, is a challenge. The national standards set for water quality, availability, and pressure must be met. [2]

Over four million individuals are forced to conduct open defecation due to a lack of appropriate sanitary services. An additional two million are forced to use unprotected pit latrines or buckets. These circumstances put individuals at a higher risk of developing foodborne and waterborne infections. Water-related infections such as typhoid and acute bloody diarrhea are on the rise as a result of these dangers. Furthermore, these disorders have a financial impact on our citizens and the country.

Even though COVID-19 highlights the importance of hand hygiene in preventing disease transmission. UNICEF (2022) mentioned that three billion people globally, including hundreds of millions of school-aged children, lack access to soap-free handwashing facilities. The most susceptible and affected include people living in rural areas, urban slums, disaster-prone locations, and low-income countries. [3]

People can die because of unsafe water, sanitation, and hygiene. The Department of Health reported that Cholera cases have increased by 231% in the Philippines this year (757 cases through July 23, 2021, vs. 2,508 cases in 2022). Furthermore, the number

of cholera deaths has climbed from three last year to 20 this year to date. The importance of Clean Water, Sanitation, and Hygiene in improving health is crucial for every individual (News Desk, 2022). [4]

The study focuses on the importance of Clean Water, Sanitation, and Hygiene in improving student health among Environmental and Sanitary Engineering Students for safe, sufficient, accessible, acceptable, and affordable water, sanitation, and personal hygiene.

This study aims to know the effectiveness of WASH interventions by various ages on EnSE students' health and is designed to help students, faculties, teachers, parents, the government, and other stakeholders in planning and providing clean water, sanitation, and personal hygiene on strengthening students' health.

II. RELATED WORKS

World Health Organization (2020) stated that water and sanitation are central to human life, health, Well-being, dignity, and sustainable development. Universal and equitable access to enough safe drinking water and adequate sanitation are basic human rights. A progressive approach is required to ensure equity, accessibility, availability, and affordability of water and sanitation services for all, and in all settings where people live, study, play, work, rest and seek care. The 2030 Agenda for Sustainable Development recognizes the central role of WASH in its Sustainable Development Goals (SDGs). In addition, clean water and sanitation are vital elements that need to prioritize, much less having a big impact on the human body. This also has a wide range of natural approaches in the environment, a natural resource that consumes to progress community development. Not only that, but it also enriches the security for good health and well-being, whereas one of the common sources of diseases are water. [5]

The World Bank (2020) seconded the World Health Organization that sanitation and access to clean water are fundamental human rights. Sustainable development is centered on achieving universal, adequate, and equitable access to safely managed water and sanitation services. The COVID-19 pandemic has further emphasized the significance of practicing good hygiene by washing your hands frequently and having access to clean water. Even with recent advancements, billions of people worldwide still lack access to sanitary facilities. [6]

Guppy, L., & Anderson, K., (2017) stated that water scarcity and insecurity are huge problems all over the world, and they are only getting worse as a result of poor hygiene and sanitation in the community, which causes the main water source to be toxic. Prioritizing the importance of clean water would result in significant benefits for natural resources and reduced disease in the human body. Fresh water is critical to running a country; historically, temples and castles were built near bodies of water for protection as well as resources for fishing, drinking, and farming. As we all know, salt water has a much wider range than freshwater, so instilling cleanliness and proper treatment would help us reduce cases of water pollution. [7]

The benefits of having clean water and sanitation mean being able to avoid exposure to countless diseases. As mentioned by the United Nations Foundation (2017), Millions of people perish each year from diseases brought on by poor water quality, sanitation, and hygiene. Diarrhea, rather than pneumonia, is the leading cause of death in children under the age of five. [8]

According to the Ministry of Health and Medical Services, Solomon Islands (2021), to reduce the likelihood of water shortages, water resource management is crucial for agriculture, water conservation at home, and community needs. Together, we must take care of and safeguard our lakes, rivers, and other bodies of water from exploitation and pollution. In addition, they create a manual that aims to provide healthy village facilitators with fundamental WASH knowledge so they can work with village leaders and provincial health programs to promote the use of safe water supplies, construct and utilize proper sanitation facilities, and practice good basic hygiene to improve their health, dignity, and wellbeing. Continuous WASH improvement will not only lessen the effects of ill health and poverty but also advance the social and economic development of the country over time. [9]

More than 800 children die each day from diarrheal illnesses associated with poor hygiene, making water and sanitation-related diseases one of the leading causes of death in children under the age of five. The Sustainable Development Goals, which include gender equality and good health, depend in large part on having access to clean water and sanitary facilities. United Nations Publications (2018) stated that by managing water sustainably, we are also able to better manage our production of food and energy and contribute to decent work and economic growth. Moreover, we can preserve our water ecosystems, and their biodiversity, and act on climate change. [10]

Effective management requires addressing unresolved issues like the estimated 30% water waste in current systems, institutional dysfunction that is common, unethical behavior, lax accountability, and corruption in the water sectors of many nations, including the Philippines.

WASH or water, sanitation, and hygiene, problems have an impact on everyone's health and well-being. You can't turn on the news without hearing about hand washing as we all deal with the coronavirus pandemic. But with clean water so far away, how do families wash their hands? According to Tyree (2020), around 780 million people worldwide lack access to clean water sources, and 40% of people lack access to basic hand-washing facilities at home. Lack of access to water also puts women and girls at greater risk. When water is not available at home, women and girls are responsible for collecting it 80% of the time. Often, this means they make long and sometimes dangerous trips to the nearest water point. [11]

According to McCarthy (2016), everyone must drink clean water. Everyone needs access to a private, secure bathroom. Additionally, each person must be able to perform their cleaning. WASH issues are frequently taken for granted, and most people are unaware of how much of an impact they have on day-to-day life. Access to clean water, sanitary conditions, and good hygiene. However, continue to be a source of stress and disease for hundreds of millions of people. Poverty is closely related to the standard of water, sanitation, and hygiene in a person's life because it is typically accompanied by a lack of education, a lack of opportunities, and gender inequality. Southern Asia, Eastern Asia, and Sub-Saharan Africa are the regions most affected by the issue. The importance of clean water, sanitation, and hygiene includes gaining awareness of those roles and putting them into practice will produce positive outcomes, increases sustainability, and uphold the integrity of ecological and social systems. [12]

The reality of water, sanitation, and hygiene practices in the Philippines is evident to the naked eye. According to Molina et.al. (2021), as national and global water, sanitation, and hygiene targets have been set and programs have been implemented, the study aimed to assess the attainment of these targets at the local level in selected areas in Davao Region, Philippines. Randomly selected households were assessed for water, sanitation, and hygiene indicators using a modified tool that combined national guidelines and global recommendations. Most barangay's verified access to improved drinking water sources fell short of targets, and all barangay's verified sanitary toilet coverage fell short of targets. In some barangays, a significant difference between reported and validated access to better water and sanitation services was found. Only 51.2% of the approximately 87.5% of households with a hand-washing facility had access to both water and soap. The Philippines' decentralized healthcare system makes it difficult to meet the goals due to the monitoring gap. [13]

With the strong commitment of the Philippines to achieve the sustainable development goals of the United Nations 2030, the Philippine government works hand-in-hand with all government agencies to attain these goals. The Philippine government has stated its intention to move the entire nation towards sustainable development and low-emission growth, which creates strong signals and political will for action across levels of government and sectors. As a result, these efforts are in line with other national policies and priorities.

III. METHODOLOGY

This study is qualitative research that can be utilized to gain a deeper understanding of a topic or to develop fresh research ideas, and it has a lot of the same qualities as an action research study. Surveys, questionnaires, and interviews can be used to gather data from the participants using action research.

The researchers of this study chose to collect data from respondents using the Qualitative Analysis Process. The researchers will go through the process of acquiring, organizing, and evaluating qualitative data to figure out what it means. Below is the framework of the said process: [source: Biggam, 2008, p.118]

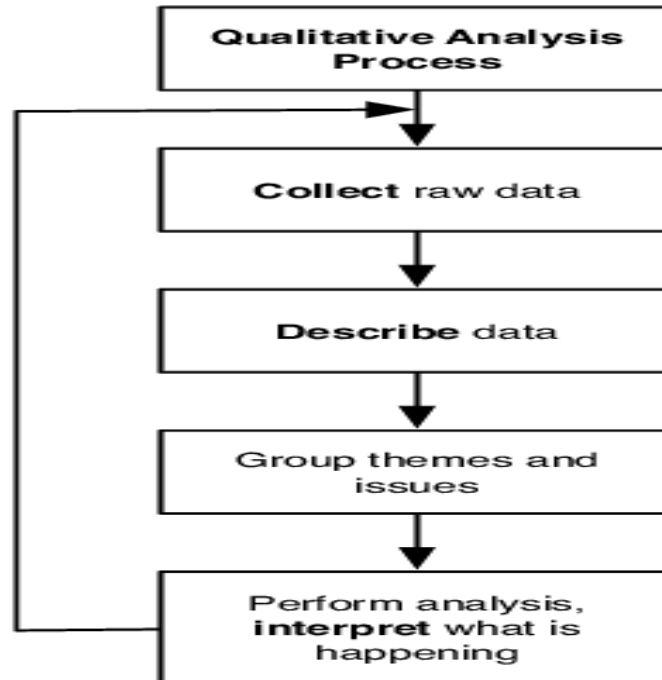


Figure 1
Qualitative Analysis Process

3.1 Settings and Participants

The subject of the study is environmental and sanitary engineering students from the National University - Manila.

3.2 Survey Instruments

The instrument used in the study is a combination of questionnaires published online by past researchers of the incline or related topic. It consists of inquiries that will supplement answers we deem useful for the study.

The Questionnaire was then divided into two parts. Part I is where the profile of the Respondents is. Part II and Part III are comprised of the specific questions the participants to answer. At the end of Part III, the respondents will answer with the help of the Likert Scale Effectivity.

It also has some additional questions that will help provide data for a better and broader understanding of the topic.

3.3 Procedures and Data Collection

The researchers first requested a copy of the list of EnSE students at the University Registrar.

After the questionnaire had been validated, the researchers started to float the questionnaires among the selected EnSE students of the National University who agreed to be a part of the study for survey purposes.

Then, the researchers handed over the personal information sheets together with the survey questionnaires to the target respondents through online communications. The survey questionnaires were collected immediately after the respondents answered the survey. Only 56 out of the total number of questionnaires were considered valid and fitting for the study.

The gathered data were tailed, computed, analyzed, and interpreted using the proper statistical treatment. After, it will be prepared for the discussion, presentation, conclusion, and recommendation.

For the illustration, here is the data-gathering flow/procedure of the study:

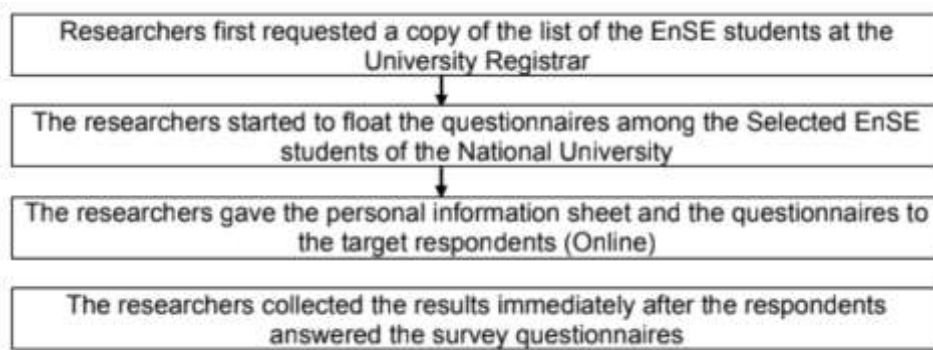


Figure 2

Data Gathering Procedure

3.4 Data Analysis

The descriptive research method is used in gathering the needed information for this study. This strategy empowers the researchers to decipher the hypothetical significance of the discoveries and advancement for additional examinations. In particular, the analysis used an online poll kind of elucidating research technique which empowers the specialists to accumulate data from the respondents without the respondents having any trouble in addressing the inquiries needed for the researchers to have data in regard to their investigation abilities. Analysts will utilize online surveys because of the pandemic happening today.

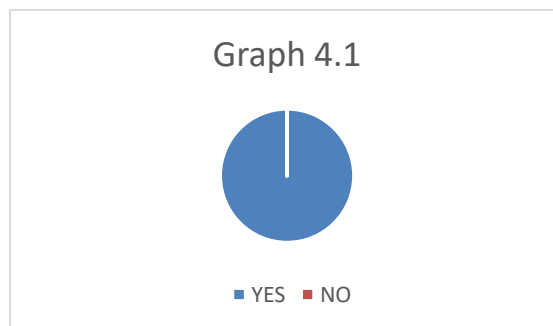
According to McCombes (2019), descriptive research aims to describe a population, situation, or phenomenon accurately and systematically. It can answer what, where, when, and how questions, but not why questions.

A descriptive research design can use a wide variety of research methods to investigate one or more variables. Unlike in experimental research, the researcher does not control or manipulate any of the variables, but only observes and measures them.

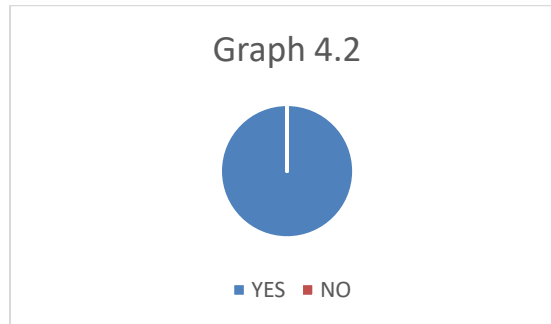
The research design was utilized in this study because the purpose of this study is to analyze and assess the effect of clean water, sanitation, and personal hygiene on strengthening student health among the environmental and sanitary engineering students of the National University Manila academic year 2022-2023.

IV. DISCUSSION OF RESULTS

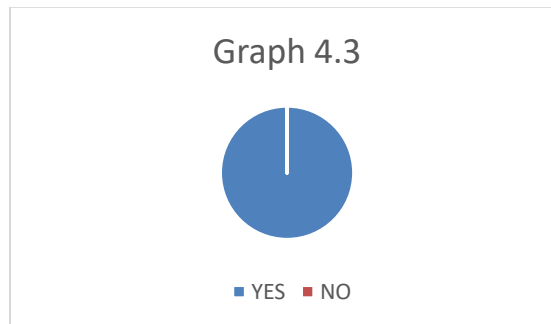
This chapter presents the key findings from a survey questionnaire distributed to ENSE students at the National University of Manila. The survey's goal was to see if Clean Water, Sanitation, and Personal Hygiene had any effect on improving students' health among environmental and sanitary engineering students. This chapter focuses on the significance and factors of clean water, sanitation, and personal hygiene to the health of National University ENSE students. Finally, the effectiveness of Clean Water, Sanitation, and Personal Hygiene is demonstrated to determine whether the students learned and/or have sufficient knowledge in stabilizing their health.



All students believe that clean water, sanitation, and personal hygiene (WASH) are critical to their health. About this, 39.3% of the 56 respondents said they have educated their peers on improving water quality, promoting new or improved sanitation, which includes informing peers to flush/pour flush toilets after use, and promoting, 30.4% said they have asked their community to avoid throwing garbage in the river, pond, and other water resources, cleaning the public restroom, and information drive on the importance of hand-washing and 3.6% of respondents said they had joined an organization to mediate a source-based water treatment, community-driven sanitation, and distribution of hygiene kits to the community, However, 1.8% said they had practiced proper WASH.



All students stated that clean water, sanitation, and personal hygiene are critical to their health., 32.1% of respondents stated that safe WASH is not only a prerequisite for health, but also contributes to livelihoods, school attendance, and dignity, as well as helping to create resilient communities living in healthy environments, while 26.8% stated that having clean water and sanitation means being able to avoid exposure to countless diseases. Safe and sufficient WASH is critical in the prevention of many diseases such as trachoma, soil-transmitted helminths, and schistosomiasis, according to 23.2% of the respondents, however, 17.9% believe that we will have good health if people know how to store water safely and build safe sanitation facilities and if children know how to properly wash their hands.



All of the students agreed that external interventions to your well-being, such as school or government, are important in improving your health. With a total of 82.1% of respondents saying that it is because it helps students make healthy lifestyle decisions and understand how those decisions affect their health and well-being, schools or government have a crucial role to play in supporting student well-being, 12.5% said schools and government can give students trustworthy information and deepen their understanding of the options available to them, and 3.6% said it appears that the government has a role to play and with the fewest votes 1.8% so that everyone is on the same page.

In terms of the importance of Clean Water, Sanitation, and Personal Hygiene interventions to their health underwater quality, the majority of the students rated 5 with 96.4% of 54 respondents saying it is important to them, while the lowest rate is 4 with 3.6% of 2 respondents saying it is important to them. In terms of water supply, 48 respondents (85.7%) rated 5 while 8 respondents (14.3%) rated 4. Moving on to Sanitation, 91.2% of 51 respondents rated 5, 7.1% of 4 respondents rated 4, and the lowest 1.8% of 1 respondent rated 3.

In terms of how the importance of personal hygiene, clean water, and sanitation. the majority of the 53 respondents (94.6%) rated 5 as the highest, However the lowest voted 4 with 3 respondents (5.3%).

About the aim of how important it is to practice personal hygiene, clean water, and sanitation, 44.6% of respondents said in addition to being a requirement for good health, safe WASH supports livelihoods, educational participation, and human dignity while fostering resilient communities with healthy surroundings, and 23.2% of respondents said it is one of the most effective ways

to protect ourselves and others from many illnesses. However, 19.6% of respondents said that basic water supply, sanitation, and hygiene services are required for the community to live decently, while 12.5% said that practicing personal hygiene, clean water, and sanitation are conditions that support a healthy lifestyle.

The majority of the respondents of 48.2% said that the role-modeling behavior of the EnSE students towards imbibing knowledge, attitudes, and practices of clean water, sanitation, and personal hygiene is through Interacting with everyone regarding clean water, good sanitation, decent personal hygiene to introduce behavioral outcomes of taking for granted of the WASH in the community while 28.6% said by demonstrating confidence and leadership by adopting and/or sustaining the use of specific WASH enabling technologies, and 23.2% said by communicating with other people by promoting an individual's handwashing and sanitizing of hands behaviors to prevent further diseases.

Most of the respondents (46 votes, 82.1%) said education on improving water quality is their intervention for safe and clean water, while 43 of the respondents (76.8%) said proper garbage disposal is their intervention for safe and clean water, 37 of the respondents (66.1%) said water source level treatment systems, 31 respondents (55.4%) said water protection before consumption, while 20 respondents (35.7%) said a household connection to a piped water supply and rainwater harvesting technology. However, the lowest vote of 21.4% with 12 respondents suggesting installing a new hand pump.

Ninety-one percent (91.1%) of 51 respondents said proper trash disposal is their intervention for good sanitation, while 71.4% of 40 respondents said flush/pour flush toilets after use. According to 69.6% of 39 respondents, industrial/hazardous waste management while 67.9% of 38 respondents said garbage collection in my home, and 58.9% of 33 respondents said wastewater treatment, However, only 55.4% of 31 respondents said they clean their toilets at least once a day.

The majority of respondents (92.9%) said taking a bath every day is their hygiene intervention, followed by 82.21% who said brushing their teeth twice a day and cleaning and disinfecting objects they frequently use such as mobile phones, keys, wallets, and work passes. While 80.4% stated that they did so by washing their hands with soap before and after eating 78.6% said they wash their hands frequently with soap and water or alcohol-based hand sanitizers and cover their mouth and nose with a tissue (or handkerchief) when sneezing or coughing. Meanwhile, the lowest vote 66.1% said to avoid touching your eyes, nose, and mouth with dirty hands.

V. SUMMARY

This part summarizes and lists all the possible effects of Clean Water, Sanitation, and Personal hygiene on keeping the health of ENSE students.

5.1. Effects of Clean Water, Sanitation, and Personal hygiene on Environmental and Sanitary Engineering Students

Based on the findings, the following can be considered the effects of Clean Water, Sanitation, and Personal hygiene on strengthening the health of ENSE students of National University – Manila that they may apply to their professional careers in the future:

- Clean Water, Sanitation, and Personal hygiene are believed to be critical in maintaining their health and promoting it by educating their peers on improving water quality, improving sanitation, and encouraging them to avoid throwing garbage in all the water resources.
- ENSE students claimed that Safe (WASH) also contributes to livelihoods by aiding the communities to live in healthy environments and preventing exposure to countless diseases.
- It was discovered that external interventions are important in guiding the students to make healthy lifestyle decisions and help them understand how those decisions can affect their well-being.

5.2. Interventions

The following are the interventions of Environmental and Sanitary Engineering Students for the practices of Clean Water, Sanitation, and Personal hygiene:

- ENSE students said that proper education and proper garbage disposal are their interventions for safe and clean water.
- ENSE students also said that proper trash disposal and flushing their toilets after use are their interventions for good sanitation.

- ENSE students' interventions for their hygiene are taking a bath every day, brushing their teeth, and disinfecting the objects they frequently use.

VI. CONCLUSION

In conclusion, the researchers discovered that clean water, sanitation, and personal hygiene are critical for everyone. ENSE students and the majority of ENSE students educated their peers on how to improve water quality. Furthermore, safe washing is not only necessary for health but also contributes to livelihood and school attendance. And external intervention is critical to one's well-being for the reason of having a healthy lifestyle choice; the researchers conclude that all SNSE students are well-versed in clean water and sanitation, as well as good personal hygiene.

VII. RECOMMENDATIONS

As the results of the study findings, the following points were recommended in line with SDG 6 (Clean Water and Sanitation):

7.1 Personal Interventions on Clean Water, Sanitation, and Personal Hygiene

- a) To contribute to attaining UNSDG # 6, which is "Clean Water and Sanitation", continuously educating the students on improving water quality, promoting new or improved sanitation including but not limited to informing peers to flush/pour toilets after use, proper disposal of trash, taking a bath every day, and promote the further practice of handwashing with soap is highly recommended by the researchers.
- b) With this, the university and the government will also keep their attention to the proper disposal of waste, avoiding wasting water, and mitigating the risk of any health-related illness by teaching them about WASH which will help the ENSE students keep safe from imminent danger. It also helps the university and the students to become more aware in terms of taking care of the surroundings.

7.2 Behavioral Approach to Water Resources and Cleanliness

- a) In line with the first recommendation, incorporating the topics of clean water, sanitation, and personal hygiene into the curricula of the students to understand by everyone the importance of potable water, good sanitation, and decent hygiene to introduce behavioral outcomes of taking for granted of the WASH in the community. This will result in contributing to attaining UNSDG # 6 because of making certain that everyone has access to water and is managed sustainably.
- b) Once the topics are incorporated into the curricula, safe WASH supports livelihoods, educational participation, and human dignity while fostering resilient communities with healthy surroundings.

7.3 Developing an inquiry-based project about WASH as a requirement for graduation

- a) As the official wording of SDG # 6: "Ensure availability and sustainable management of water and sanitation for all", the researchers recommend WASH and interventions are necessary for the health of everyone to avoid exposure to countless diseases. The researchers want to suggest a university policy about inquiry-based projects about WASH as a prerequisite for a particular topic like NSTP or the National Service Training Program, which aims to increase the active participation of Filipino students in the welfare of the country.
- b) With this, the ENSE students will use their respective creativity to document themselves doing their required activity. Therefore, the effects of clean water, sanitation, and personal hygiene on strengthening students' health are not just limited to educating their peers but more importantly as a tool to spread knowledge about protecting, contributing to, and caring for the environment. This recommendation, the researchers believed, will be a great help in attaining UNSDG # 6 – Clean Water and Sanitation.

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