

INTERNSHIP PRACTICE REPORT

Creating a Storyboard Using Python Programming and Visualization

“Addressing the Water Crisis in Southeast Asia Adapting Best Practices to  
Solve Drinking Water and Sanitation Issues”

Technological Institute of the Philippines



By :

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INFORMATION S1 STUDY PROGRAM  
INDUSTRIAL TECHNOLOGY FACULTY  
AHMAD DAHLAN UNIVERSITY

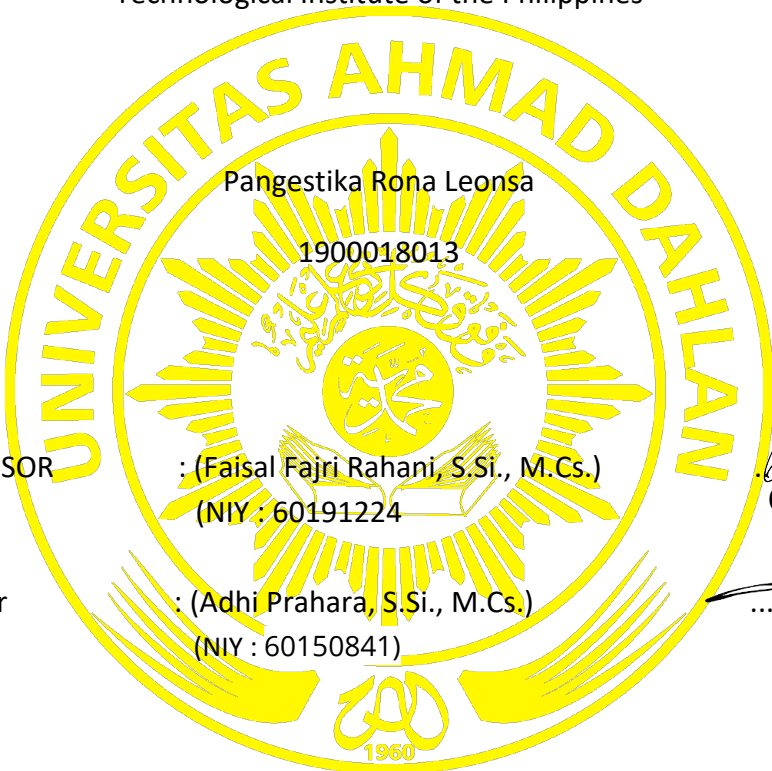
2023

APPROVAL PAGE

INTERNSHIP PRACTICE

Creating a Storyboard Using Python Programming and Visualization

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The seal of Universitas Ahmad Dahlan is a large yellow circular emblem. It features a central sunburst with Arabic calligraphy, surrounded by the text "UNIVERSITAS AHMAD DAHLAN" in a circular border. At the bottom of the seal, the year "1960" is inscribed.

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## PREFACE

Praise gratitude the presence of Allah SWT who has bestow His mercy, guidance so that author could complete internship report with title Creating a Storyboard Using Python Programming and Visualization.

On this occasion, the author would like to express his gratitude to those who have helped, especially to:

1. To my parents and family who have given a lot of enthusiasm and motivation so that I can complete this internship report.
2. Mr. Dr. Murinto, S.Si., M.Kom. as Head of Informatics, Faculty of Industrial Engineering, Ahmad Dahlan University Yogyakarta.
3. Mr. Faisal Fajri Rahani S.Si., M.Cs. as virtual student exchange supervisor.
4. Engr. Cecilia Venal as the Head of the Computer Engineering, Technological Institute of The Philippines.
5. Engr. Richard Roman, and Dr. Alonica Villanueva as a teacher in this activity
6. Denelle Jin Mendoza, and Kierwin Jov Ramos as Student Buddie

Hopefully this internship report can bring many benefits to the author as well as to the readers. The author also does not close the opportunity if the readers are willing to provide criticism and suggestions for the good of this report. The author apologizes if there are many shortcomings in making this internship report.

Yogyakarta, 22 November 2022  
Authors,

Pangestika Rona Leonsa

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# CHAPTER I

## INTRODUCTION

### A. Background

The Southeast Asian Ministers of Education Organization (SEAMEO) is a regional intergovernmental organization established in 1965 among the governments of Southeast Asian countries to promote regional cooperation in education, science and culture in the region.

Technical and Vocational Education and Training (TVET) is one of the from seven field priority development education in Southeast Asia from 2015 to 2035. This is recognized by official by the ministers Southeast Asian education at the Strategic Dialogue of Education Ministers (SDEM) meeting held in Laos in September 2014.

The establishment of the “SEA-TVET Consortium” is one of the strategies recommended by TVET Senior Officials from Southeast Asian countries to promote the exchange of TVET students and staff, which will include industry cooperation programs and cross-border internships. In addition, the SEA-TVET Consortium will formalize the partnership between TVET institutions and the industrial sector, and operationalize SEA-TVET activities, which are implemented by SEAMEO to achieve the following objectives:

1. To improve TVET standards and competencies in Southeast Asia through internationalization and harmonization;
2. Promote and develop curriculum harmonization, and internationalization of study programs through lecturer/student exchanges, joint research programs and industrial relations; and
3. To create a sustainable networking platform among leaders and institutions of TVET in Southeast Asia and industry, as well as development agencies and other related industrial sectors.

The SEA-TVET consortium is made up of TVET institutions in Southeast Asian countries who agree to cooperate in harmonizing and internationalizing their programs through curriculum harmonization, student and staff exchanges, and industry engagement, and resource sharing.



The Office of International Affairs (OIA) supports Ahmad Dahlan University's global vision by providing leadership, raising awareness, facilitating the pursuit of international education and encouraging global collaboration for the world's university community. Therefore, the International Affairs Office of Ahmad Dahlan University together with the Technological Institute of the Philippines formed the "SEAMEO TVET virtual Student Exchange program". This program is a manifestation of the vision and mission of the Ahmad Dahlan University.

Taking this short course can provide insight into various data visualization techniques, how to analyze data, and how to present data in an effective way. In addition, participants can understand how to use various tools to present information visually. Thus, participants will be able to create high-quality and informative graphs to present data effectively. And finally, participants will be able to use various tools to facilitate their work.

## **B. Identity Short course**

### **1. Category Short course**

This activity category is short course for 2 weeks.

### **2. Short course Level**

This Short course Level activity is international.

## **CHAPTER II**

### **Overview of Short Courses**

#### **A. Short course organizer**

Ahmad Dahlan University through the Office of Affairs International cooperate with the Technological Institute of the Philippines (TIP). The Technological Institute of the Philippines (TIP) are located in 363 Pascual Casal St, Quiapo, Manila, 1001 Metro Manila, Philippines, maps <https://goo.gl/maps/iZP12YEIJTkDNmRK6>.

#### **B. Short course Location**

Implementation Short course conducted online via zoom meeting.

#### **C. Execution Time Short course**

Short course held on:

- Day, date : Monday, 30 May 2022 – 10 June 2022
- Time : 8.00 - 11.00 WIB
- Duration : 3 Hours

#### **D. Short course Scope**

Short course scope on this activity:

1. Programming language used is python
2. Tool or application used include Google Data studio and Tableau

## CHAPTER III

### Stages Preparation Short course

#### A. Short course Plan Schedule

The plan short course schedule includes:

1. Registration : March 29, 2022
2. Opening : May 24, 2022
3. Activity : 30 May - 13 June 2022
4. Closing : 13 June 2022

#### B. Short course Schedule

Schedule activity short course started from opening, material, and closing could see from table 3.1.

Table 3. 1 (Short course Schedule)

Week	Date	Time (PH Time)	Allotted time	Activities
1	May 30, 2022 / Monday	9:00 - 11:30 AM	2 hours	Virtual Exchange Program Onboarding Orientation and Cultural Presentation Session
	June 01, 2022 / Wednesday	2:30 – 5:30 PM	3 hours	Participation in Synchronous Class (Computational Thinking with Python) – Data Analysis and Data Analytics Part 1
	June 2, 2022 / Thursday	2:30 – 5:30 PM	3 hours	Peer Session and Tutoring
	June 03, 2022 / Friday	9:00 – 12:00 PM	3 hours	Webinar on Data Visualization using Google Data Studio
	June 03, 2022 / Friday	2:30 – 5:30 PM	3 hours	Participation in Synchronous Class (Computational Thinking with Python) – Data Analysis and Data Analytics Part 2
2	June 06 2022 / Monday	2:30 – 5:30 PM	3 hours	Webinar on Data Visualization using Tableau
	June 07, 2022 / Tuesday	9:00 – 12:00 PM	3 hours	Webinar on Creating Storyboard
	June 08, 2022 / Wednesday	2:30 – 5:30 PM	3 hours	Peer Session and Tutoring and Preparation for the Culminating Activity (Week 2)
	June 09, 2022 / Thursday	10:00 – 12:00 PM	2 hours	Peer Session and Tutoring TIP QC CPE Design Project Colloquium
	June 10, 2022 / Friday	9:00 – 12:00 PM	3 hours	UAD-TI P.QC Presentation of Project
	June 10, 2022 / Friday	2:30 PM - 5:30 PM	3 hours	Presentation of Learning Experiences and Reflection on the Exchange
	June 13, 2022/ Monday	09.00 – 12.00 PM	3 hours	Closing Ceremony SEA-TVET UAD and TIP Philippines

## **CHAPTER IV**

### **Implementation Results Short Course Internship**

#### **A. Shortcourse Results**

##### **1. Process Short courses**

This Shortcourse activity was held for 2 weeks online through a zoom meeting. The Technological Institute of the Philippines has assigned 8 students as Student Buddies. They will help students from Ahmad Dahlan University in the learning process.

On the first week, the material presented was about Data Analysis and Data analysis by Engr. Richard Roman. The material given to students includes an introduction to data analysis, life cycle data analysis, and the programming language used. At this time the programming language used is Python by using Google Colab as an application to run the program. Mr. Roman also directly gives an example of doing a data analysis using the data set that has been provided. After that, in the peer session, the students tried again what was exemplified by Mr. Roman is helped by student buddies.

On the second week, the data visualization process was carried out using google data studio and table by Dr. Alonica Villanueva. Ahmad Dahlan University students joined with students from the Technological Institute of the Philippines to create a storyboard using Google Data Studio from the data set that had been provided. The next session is the making of the final project. Where this assignment was made together with students from the Technological Institute of the Philippines using Tableau.

##### **2. Summary of Materials delivered during the Short Course**

###### **a. Introduction to Data Analysis**

Data analysis is a process of inspecting, cleansing, transforming, and modelling data with the goal of discovering useful information, informing conclusions, and supporting decision-making. Data analysis is the process of collecting, modelling, and analyzing data to extract insights that support decision-making.

## Data Analysis life cycle

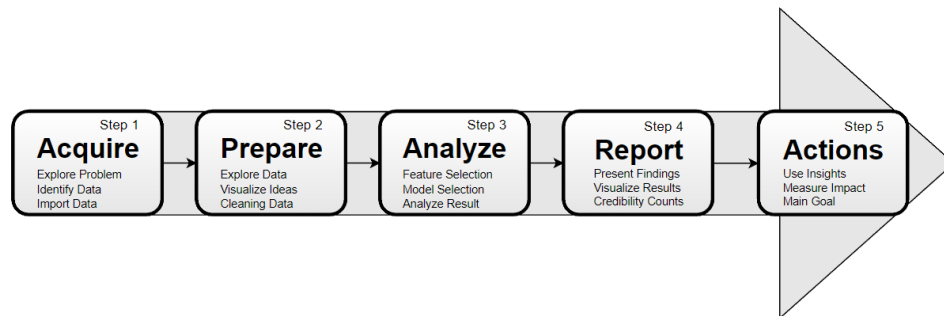


Figure 4. 1 (Data Analyst Life Cycle)

1. Acquire: process of exploring problems, identifying data, and importing data.
2. Prepare: the process of exploring data, visualizing ideas, and cleaning data.
3. Analyze: Feature selection, model selection, and analysis result.
4. Report: Present findings, visualize results, and credibility counts
5. Actions: Use insights, measure impact, and main goals

### b. Data Analysis Tools in Python

#### 1. Pandas

The pandas package is the most important tool at the disposal of Data Scientists and Analysts working in Python today. The powerful machine learning and glamorous visualization tools may get all the attention, but pandas is the backbone of most data projects. [pandas] is derived from the term "panel data", an econometrics term for data sets that include observations over multiple time periods for the same individuals.

#### 2. Numpy

NumPy is a Python library used for working with arrays. It also has functions for working in the domain of linear algebra, Fourier transform, and matrices. NumPy was created in 2005 by Travis Oliphant. It is an open-source project and you can use it freely. [NumPy] stands for Numerical Python.

#### 3. Matplotlib

Used for vivid plotting to see the patterns in data

#### 4. Seaborn

A "cooler" version of matplotlib

### c. DATA GATHERING and Preparation

#### A. Valid Sources for gathering data

##### i. Collecting of Data

1. Determine the amount of data needed

2. Depends on the ability of the device used for the collection
  3. Necessity of the data
  4. Not all data can be collected (extraneous or erroneous)
  5. Data has to be cleaned to make it usable
  6. After the data has been cleaned, it can more easily be searched, analyzed, and visualized.
- ii. Sources of Data
1. Public and Private Archives
  2. CSV, JSON, and XML files use plaintext, a common format, and are compatible with a wide range of applications
  3. The Web can be mined for data using a web scraping application
  4. The IoT uses sensors to create data
  5. Sensors in smartphones, cars, airplanes, street lamps, and home appliances capture raw data
- iii. Open Data vs Private Data
1. Open knowledge is “any content, information or data that people are free to use, reuse, and redistribute without any legal, technological, or social restriction.”
  2. Structured data - refers to data that is entered and maintained in fixed fields within a file or record.
  3. Unstructured data – raw data or not organized in a predefined way
- B. Preparing Gathered Dataset
- i. Data Preparation
- Process for collecting data from a variety of sources, transforming the data, and then loading the data into a database
1. Collected data may not be compatible or formatted correctly
  2. Data must be prepared before it can be added to a data set
  3. Extract, Transform and Load (ETL)
- ii. Data Preprocessing
- Data Processing is a process of cleaning the raw data ie the data is collected in the real world and is converted to a clean data set. In other words, whenever the data is gathered from different sources it is collected in a raw format and this data isn't feasible for analysis. Therefore, certain steps are executed to convert the data into a small clean data set, this part of the process is called data preprocessing.
- Most of the real-world data is messy, some of these types of data are:
1. Missing data: Missing data can be found when it is not continuously created or due to technical issues in the application (IOT system).
  2. Noisy Data This type of data is also called outliers, this can occur due to human errors (human manually gathering the data) or some technical problem of the device at the time of collection of data.

3. Inconsistent data: This type of data might be collected due to human errors (mistakes with the name or values) or duplication of data.

## B. Jobdesk Discussion of Work/Products worked on during the Shortcourse

Final Project with the title “Addressing the Water Crisis in Southeast Asia Adapting Best Practices to Solve Drinking Water and Sanitation Issues” was created based on the data set that has been given to each group. Some data sets are given among others:

1. Basic safe management drinking water services.
2. Basic safely managed sanitation water services.
3. Percentage of Deaths caused by Diarrhea for Children Under 5
4. Share deaths unsafe water

### Addressing the Water Crisis in Southeast Asia Adapting Best Practices to Solve Drinking Water and Sanitation Issues

Freshwater consumption has increased sixfold over the past 100 years, and demand is still increasing, with agriculture, industry and energy accounting for 90 percent of the total. At least 55 percent more water will be needed by 2050 to meet the demands created by economic growth, urbanization and a global population of nearly 10 billion people. Safe drinking water, sanitation and hygiene are essential to human health and well-being. It is a prerequisite for health but contributes to livelihoods, school attendance and dignity.

Contaminated water and poor sanitation are linked to the transmission of diseases such as cholera, diarrhea, dysentery, hepatitis E, typhoid, and polio. Here, basic and safely managed drinking water and sanitation services in 2017

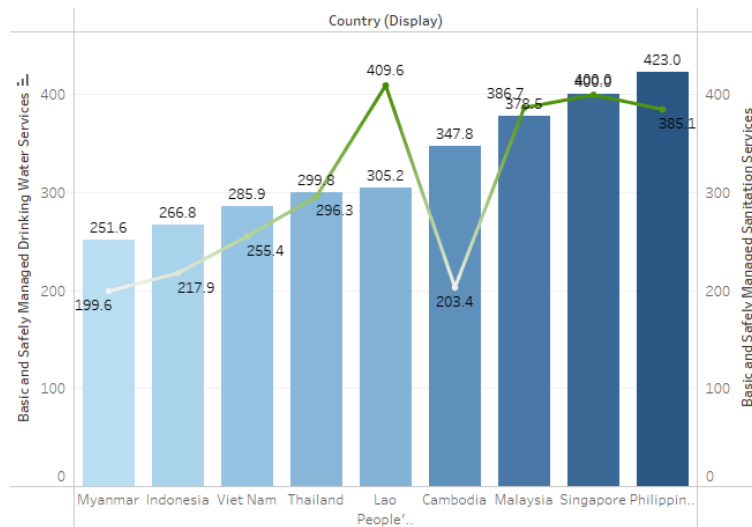


Figure 4. 2 (Basic and Safely Managed Drinking Water and Sanitation Services (2017))

The selection of bar charts and line charts is to help visualize complex data. Bar charts and line charts are two commonly used tools for visualizing data. Bar charts provide useful information about data by comparing different values in a data set. In contrast, line graphs can be used to show changes in one or more values over time.

The graphs show the basic and safely managed sanitation and drinking water services for southeast Asian nations. Mostly the higher the Basic safely managed drinking water services the better essential safely managed sanitation water services.

Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks.

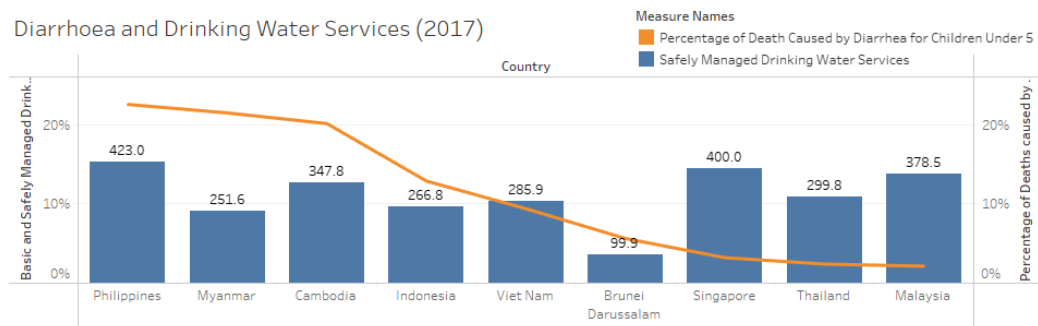


Figure 4.3 (Diarrhea and Drinking Water Services in 2017)

Bar charts are used to present safely managed drinking water services data that shows comparisons between one another. A line chart is used to compare percentages of death caused by diarrhea for children under 5. So that the comparison of 2 values is clearly visible.

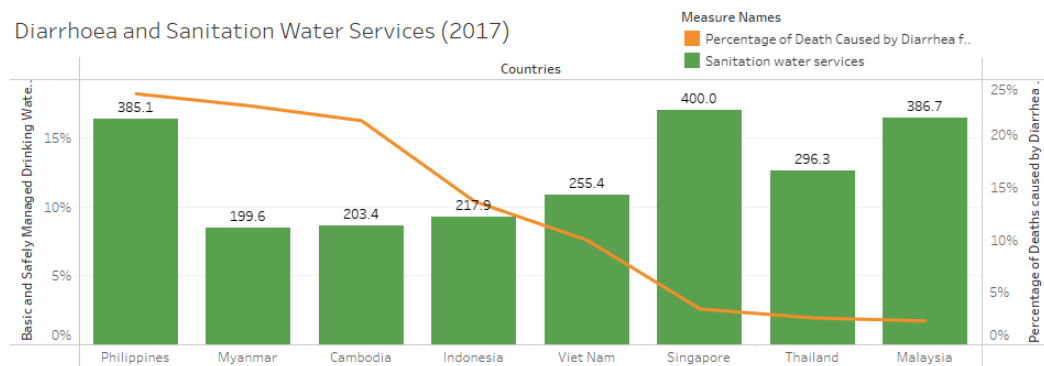


Figure 4.4 (Diarrhea and Sanitation Water Services in 2017)

Bar charts are used to present sanitation water services data that shows comparisons between one another. Consistency in the use of line charts to show data on percentages



of death caused by diarrhea for children under 5 makes it easy for readers to understand the chart.

The figures shown above indicate a consistently high performance in drinking water and sanitation services and a low rate of deaths due to diarrhea in Thailand, Singapore, and Malaysia. Clearly, there are practices in the mentioned countries regarding drinking water and sanitation services that should be adopted by other countries.

Inadequate management of urban, industrial, and agricultural wastewater means the drinking water of hundreds of millions of people is dangerously contaminated or chemically polluted.

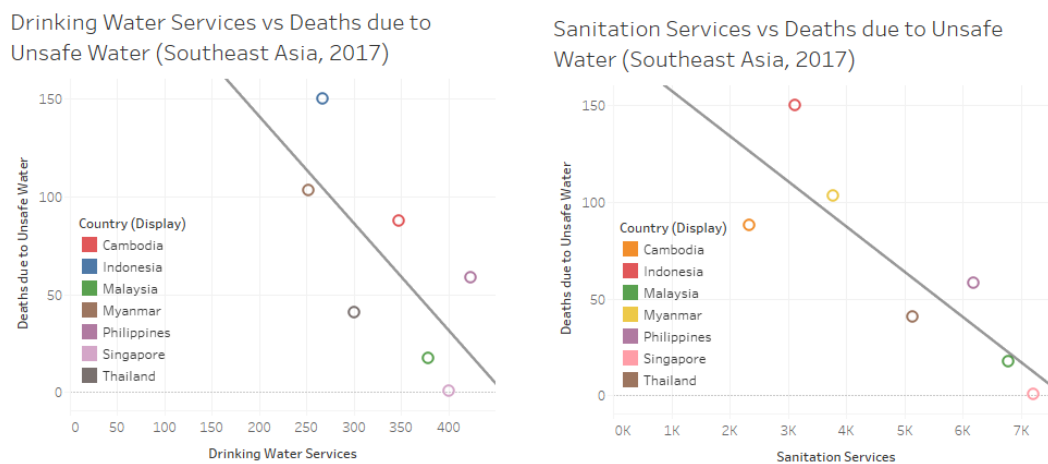


Figure 4. 5 (Drinking Water and Sanitation Services VS Deaths due to unsafe water)

Scatter plots are used to reflect a linear or non-linear relationship between two variables. By using a scatter plot, you can visually observe the relationship between two variables and make inferences about the relationship between the two. Scatter plots can also be used to visualize the relationship between different data.

Some 829,000 people are estimated to die each year in the area as a result of unsafe drinking water, sanitation, and hand hygiene. Yet diarrhea is largely preventable, and the deaths of 297,000 children aged under 5 years could be avoided each year if these risk factors were addressed. Where water is not readily available, people may decide handwashing is not a priority, thereby adding to the likelihood of diarrhea and other diseases.

The data shows that, generally, higher performance in drinking water and sanitation services yielded lower rates of death due to diarrhea and unsafe water. This is most noticeable in the following countries: such as Singapore, Malaysia, and Thailand. Some countries can improve their performance in the above-mentioned performance indicators

by adopting the best practices shown by these countries to mitigate deaths due to unsafe water.

Recommendations of the special rapporteur on the human rights to water and sanitation:

1. To diversify water sources, comprising local catchment, imported water (or recycled water), and desalination.
2. An Integrated approach towards water resource management.
3. To avoid overconsumption, water should be priced not only to recover the full costs of its production and supply but to reflect the higher cost of additional water supplies such as desalination through a Water Conservation Tax.
4. To empower the public with knowledge with regard to water usage.

## **CHAPTER V**

### **Closing**

#### **A. Conclusion**

The conclusions of this short course report are:

1. Students gain a lot of knowledge from practical sites both in theory and practice.
2. The material provided includes data analyzer and data visualization.
3. The tasks given include analyzing graduate data, web scraping.
4. The final project entitled “Addressing the Water Crisis in Southeast Asia Adapting Best Practices to Solve Drinking Water and Sanitation Issues”.
5. Some countries can improve their performance in the above-mentioned performance indicators by adopting the best practices shown by Singapore, Malaysia, and Thailand to mitigate deaths due to unsafe water.

#### **B. Suggestion**

The suggestions for the next activity are:

1. The learning schedule can be reduced to a maximum of 3 hours per day.
2. Communication between participants can be improved again.
3. The time for completing the final project can be increased.

## Attachment

### i. Brochure



Figure 1 (Brochure )

### ii. Certificate Required



Figure 2 (Certificate)

### iii. Logbook already filled at least 7x

#### iv. Documentation Activity Contest (Photo)



Figure 3 (Documentation 1)

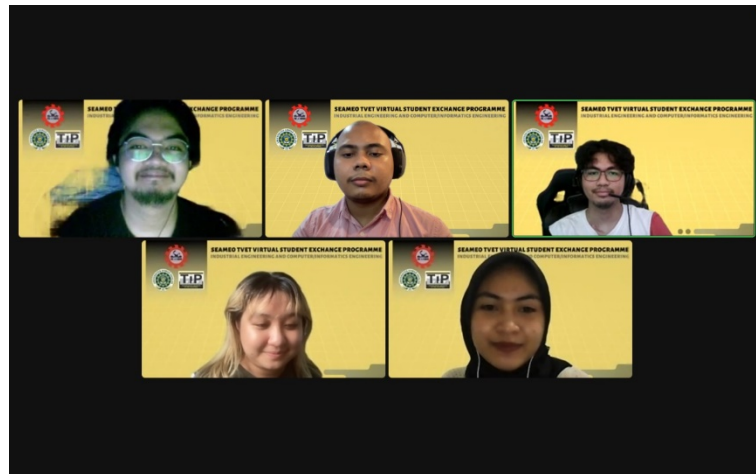


Figure 4 (Documentation 2)