CHAPTER 1 – INTRODUCTION

1.1 Background

Primary schools in Indonesia are always filled with young children who are eager to learn something new and interesting. Additionally, they require some basic knowledge before moving on to the next grade, such as hygiene practices. This is crucial because children often neglect their hygiene, which can shape their future habits and attributes. The most effective way to improve hygiene and reduce the infection rate of bacteria or viruses is by washing hands with soap.

One critical area to consider is schools with children aged between 7 to 12 years old, whose immune systems are still relatively weak compared to older students. However, there are some issues that need to be addressed. Most hand sinks are designed at a specific height, making it necessary for shorter students to raise themselves and taller students to bend slightly in order to comfortably wash their hands. Continuously doing this could lead to backaches since their bones are still growing. Another challenge is the natural behaviour of children at this age, as they tend to be very energetic and impatient. Therefore, an automatic adjustable sink is necessary to overcome these problems.

In this fully automated hand sink, direct and indirect contact is not needed as it operated automatically through a system that utilizes ultrasonic and infrared sensors. Height adjustment, water flow, and soap dispensing are all controlled by motors and sensors, eliminating the need for physical contact and making the process fast, easy, and comfortable. This sink can also attract attention and generate more interest among younger students to wash their hands frequently, helping them understand the importance of hygiene and improving their immune system.

The sink's adjustment mechanism will be redesign and construct with a more robust body from the latest studies to create an efficient working system and enhance the safety aspect of the modular structure for portability and stability. Additionally, the device can

automatically dispense water and soap from a single hose. This automated hand washing sink is an improvement based on the previous thesis conducted by Benediktus Marshall Cristoval Wijaya from Swiss German University.

1.2 Research Problems

1. Height adjustability of the sink is still not compatible for children.
2. The model design is impractical for portability and has tendency to fall over
3. Electrical components are too exposed and not secure tightly.

1.3 Research Objectives

1. To improve the height adjustability program to be compatible for children.
2. To redesign the mechanical model.
3. To improve the modular structure for portability and stability.

1.4 Significance of Study

1. The sink model has an automatic hand washing cycle therefore no physical touch is needed.
2. The height adjustment system will measure the height dimensions of the user to adjust the required height for easy hand washing.

1.5 Research Questions

1. Will the redesign model be strong enough to prevent falling over from external and internal force?
2. What is the best method to be used in this device to find the required hand height?
3. How to adjust and measure the sink to the required height of the user?

1.6 Hypothesis

1. The redesign model aims to ensure the strength of the device to withstand any external and internal forces.

2. Anthropometry data is employed as a method to determine the accurate and necessary measurements of physical properties of a human body.

3. The system is using 2 ultrasonic sensors to measure the user's height and the sink's height.