Effectiveness of Arduino Uno as A Teaching Model on Constructing Automatic Hand Washer

Kerbykiel Apellido*, M. Magbanua, C. Catolos, B. Bernan, F. Friales

Sultan Kudarat State University, Tacurong City, 9800 Sultan Kudarat, the Phillipines
Correspondence: E-mail: kerbykielapellido@sksu.edu.ph

ABSTRACTS
The purpose of this study was to demonstrate the construction of an Arduino-based automatic washer. Arduino Uno was used since it can be used as a teaching model. The results showed that the overall appearance of its size, portability, eye-catching, and neatness is acceptable. In terms of releasing the water, soap, and the screen display, it is reasonable because the average means are acceptable. Lastly, the product’s overall performance in terms of its function and appearance is generally better than good and average. The product is valuable, and it was accepted by many. However, the researchers should work on its appearance and function since it’s not perfect. The study’s impact will give better awareness for future users as it will be easy for them to wash their hands as well as no need to hold the product as a result of the fast transmission of pathogens.

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1. INTRODUCTION

Everyone experiencing a significant challenge in terms of social and health crises due to the outbreak of Covid-19. When the issue arose, we decided to study what suits this pandemic, assessing Arduino Uno’s effectiveness in hand washing is the main target of the study. This study aimed to produce an Automatic Hand washer and test its performance and its significance. In every research study, Innovation plays an important part in able for the researchers to determine the novelty of the existing study from previous studies, one of the related studies utilized an infrared sensor as a hand detector and using the Arduino Uno as the main controller (Sitompul, 2021), this is where we mainly based their current study yet it differs and refined as the researchers tried to add soap to the product and improved its appearance for more possibility to capture people’s interest to the product. Arduino Uno has been well known as a teaching model.

In recent years, hand washing with soap and other forms of hand hygiene has been gaining recognition as a cost-effective, essential tool for achieving good health and nutrition (Liu et al., 2010; Yang et al. 2019). Some people also used alcohol-based soap for supporting the hygiene condition (Umair et al., 2010).

Now that its effectiveness is no longer in question, the main focus is on how to make handwashing universal. Students nowadays with new thinking about behavior change such as habit formation increased research into the impact of hygiene (Sitompul et al., 2021; Imam & Kabir, 2020).

Since there is nCOV or Corona Virus that is now spreading, we aimed to demonstrate the construction of an Arduino-based automatic washer. Arduino Uno was used since it can be used as a teaching model. We produced an automatic hand washer machine for those children who always use gadgets or mobile phones, who always eat and play around with dirt. This Automatic Hand washer will be placed in the bathrooms of selected elementary schools. It is easier for children who are closely monitored to keep their hands clean with constant reminders. On the other hand, adults who are usually caught up with the daily activities have a higher tendency to overlook hand washing.

This research employed a quantitative design that fosters in evaluating the product. It was gathered at Purok Aliwan, barangay Grino, Tacurong city. We used a descriptive evaluation research design to determine the respondents’ feedback about the product, Arduino Uno for Automatic Hand washer. It employed the use of a survey and descriptive statistics method to obtain the needed data.

2. METHODS

The mean is the average of the numbers, the calculated central value of a set of numbers. To calculate the mean, it is a must to add up all the numbers, then divide by how many numbers there are. In our research, the statistical mean refers to the average that is used to derive the central tendency of the data or the ratings that we’ve collected from the questions in the questionnaire. In gathering the data, the rating scale that will be used is the Likert Scale.5 - Acceptable, 4 - Slightly Acceptable, 3 - Undecided, 2 - Slightly Not Acceptable, and 1 - Extremely Not Acceptable.

Table 1 shows the rating scale used by the respondents to reflect their evaluation is shown below. In treating the gathered data, the following scale was applied.
Table 1. The rating scale used by the respondents.

| Range        | Scale | Description   |
|--------------|-------|---------------|
| 4.21 – 5.00  | 5     | Acceptable    |
| 3.41 – 4.20  | 4     | Slightly Acceptable |
| 2.61 – 3.40  | 3     | Undecided     |
| 1.81 – 2.60  | 2     | Slightly Unacceptable |
| 1.00 – 1.80  | 1     | Not Acceptable|

3. RESULTS AND DISCUSSION

3.1. Appearance of Arduino Uno: Automatic Hand Washer in Terms of Size

Table 2 reveals the respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its size. The result reveals that generally, the size of the Automatic Hand washer is described by the respondents as acceptable based on the computed overall mean of 4.57.

3.2. Portability

Table 3 presents the respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its portability. The result reveals that in general, the portability of the Automatic Hand washer is described by the respondents as acceptable based on the computed overall mean of 4.26.

3.3. Eye-Catching

Table 4 shows the respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its eye-catchingness. Generally, this eye-catching characteristic of the Automatic Handwasher is described by the respondents as acceptable based on the computed overall mean of 4.39.

Table 2. The respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its size.

| Description                                      | Mean | Description   |
|--------------------------------------------------|------|---------------|
| The product is fit in the desired area            | 4.57 | Acceptable    |
| The product is well designed for Hand washers.    | 4.57 | Acceptable    |
| Overall                                          | 4.57 | Acceptable    |

Table 3. The respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its portability.

| Description                                      | Mean | Description   |
|--------------------------------------------------|------|---------------|
| The product can be hand-carried                   | 4.23 | Acceptable    |
| It is light in weight                             | 4.10 | Slightly Acceptable |
| The product is easy to transport                  | 4.23 | Acceptable    |
| The product can be used anywhere                  | 4.47 | Acceptable    |
| Overall                                          | 4.26 | Acceptable    |

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Table 4. Academic support of parents in online learners.

|                                | Mean | Description   |
|--------------------------------|------|---------------|
| The appearance is nice         | 4.30 | Acceptable    |
| The appearance is compatible to be Hand washer | 4.47 | Acceptable    |
| Overall                        | 4.39 | Acceptable    |

3.5. Neatness

Table 5 shows the respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its neatness. Generally, the neatness of the Automatic Hand washer is described by the respondents as *slightly acceptable* based on the computed overall mean of 4.09.

3.6. Releasing The Water

Table 6 presents the respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the release of water. In general, the release of water of the Automatic Hand washer is described by the respondents as *acceptable* based on the computed overall mean of 4.47.

3.7. Releasing of The Soap

Table 7 displays the respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the release of soap. In general, the release of soap of the Automatic Handwasher is described by the respondents as *acceptable* based on the computed overall mean of 4.33.

3.7. Providing Screen Display

Table 8 shows the respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the screen display. In general, the screen display of the Automatic Hand washer is described by the respondents as *slightly acceptable* based on the computed overall mean of 3.95.

Table 5. The respondents’ evaluation of the appearance of the Automatic Hand washer in terms of its neatness.

|                                | Mean   | Description         |
|--------------------------------|--------|---------------------|
| The wires are organized         | 3.87   | Slightly acceptable |
| The sensors are properly placed | 4.17   | Slightly acceptable |
| The parts are correctly arranged| 4.23   | Acceptable          |
| Overall                        | 4.09   | Slightly Acceptable |

Table 6. The respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the release of water.

|                                | Mean    | Description         |
|--------------------------------|---------|---------------------|
| It releases enough amount of water to wash hands | 4.73    | Acceptable          |
| It releases water immediately  | 4.20    | Slightly acceptable |
| Overall                        | 4.47    | Acceptable          |
Table 7. The respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the release of soap.

|                                      | Mean | Description |
|--------------------------------------|------|-------------|
| It releases enough amount of soap    | 4.23 | Acceptable  |
| It releases soap accurately          | 4.43 | Acceptable  |
| Overall                              | 4.33 | Acceptable  |

Table 8. The respondents’ evaluation of the functionality of the Automatic Hand washer in terms of the screen display.

|                                      | Mean   | Description       |
|--------------------------------------|--------|-------------------|
| The screen functions promptly        | 3.90   | Slightly acceptable |
| The screen is clear and vivid        | 4.00   | Slightly acceptable |
| Overall                              | 3.95   | Slightly Acceptable |

4. CONCLUSION

In conclusion, the study utilizes descriptive statistics to come up with a picture of the respondents testing the product and it presents favorable results. The findings gathered the appearance in terms of its size, portability, eye-catching and neatness it is a great view because the average mean is acceptable, for the functions in terms of how it releases water and soap and the screen display it is at a good level because the average mean is acceptable, and lastly, for the overall performance of the product in terms of its functions and appearances is at a performance generally better than average and good.

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6. AUTHORS’ NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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