JURNAL UPI

Indonesian Journal of Multidisciplinary Research

IJOMR Indonesian Journal of Multidiciplinary Research

Journal homepage: http://ejournal.upi.edu/index.php/ IJOMR/

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.

ARTICLE INFO

Article History:
Submitted/Received 27 Mar 2021
First revised 08 May 2021
Accepted 11 Aug 2021
First available online 20 Aug 2021
Publication date 01 Sep 2021

Keyword:
Arduino,
Automatic,
Education,
Hand wash,
Hygiene,
Soap.

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 their 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.

DOI: http://dx.doi.org/10. 17509/xxxx.vxix
p- ISSN 2776-608X e- ISSN 2776-5970

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-catchiness. 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.

	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.

	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**

DOI: http://dx.doi.org/10.17509/xxxx.vxix
p- ISSN e- ISSN

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**

DOI: http://dx.doi.org/10. 17509/xxxx.vxix
p- ISSN 2776-608X e- ISSN 2776-5970

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.

5. ACKNOWLEDGEMENTS

We wanted to give thanks to the research advisers and respondents who take part in the conduction of the study.

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.

7. REFERENCES

Imam, H. T., and Kabir, N. B. (2020). Effectiveness of smartphone on EFL reading: Learners'perception in Asian countries. *European Journal of Education Studies*, *7*(12), 675-714.

Liu, P., Yuen, Y., Hsiao, H. M., Jaykus, L. A., and Moe, C. (2010). Effectiveness of liquid soap and hand sanitizer against Norwalk virus on contaminated hands. *Applied and Environmental Microbiology*, *76*(2), 394-399.

Sitompul, B. P., Solikhun, S., Saputra, W., Gunawan, I., and Sumarno, S. (2021). Design and build of automatic hand sanitizer using arduino. *Eduvest-Journal Of Universal Studies*, *1*(3), 119-127.

Umair, J., Julie, L., and Douglas, K. (2010). Effectiveness of alcohol-based hand rubs for removal of Clostridium difficile spores from hand. *Infect Control Hospital Epidemiol*, *31*(6), 565-70.

Yang, J., Park, E. C., Lee, S. A., and Lee, S. G. (2019). Associations between hand hygiene education and self-reported hand-washing behaviors among Korean adults during MERS-CoV outbreak. *Health Education and Behavior*, *46*(1), 157-164.

DOI: http://dx.doi.org/10. 17509/xxxx.vxix
p- ISSN 2776-608X e- ISSN 2776-5970