

## Modified garbage dustbin reminder system

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**Abstract:** This study was conducted in order to develop the modified garbage dustbin reminder system. Specifically, it aimed to determine the following objectives: (1) determine the sensitivity of the modified garbage dustbin reminder system in terms of three varying distances 1m, 2m and 3m; (2) determine the charging/discharging time of the modified garbage dustbin reminder system; and (3) determine the acceptability of the modified garbage dustbin reminder system in terms of composition, operating performance and technical features. This study may be beneficial to the schools, consumers, students, households, garbage collector, offices, and future researchers. This project aimed to help the above mentioned to facilitate garbage disposal, to separate the kind of waste and avoid touching bacteria from the bin. This study also helped those future researchers and inventors/ innovators for future references. This study covered the Modified garbage dustbin reminder system. This study was conducted at Capiz State University, Main Campus, Fuentes Drive, Roxas City. This study utilized mean in analyzing the data. Mean was computed to determine the acceptability of Modified garbage dustbin reminder system in terms of the composition, operating performance and technical features. This study was limited to the conception of the researchers on how this system was acceptable. The result showed that the MGDRS was effective to remind the user, the product can fully charge in 3 hours using 1amp charger and can operate in 10hr with a remaining voltage of 10.54v. The result showed that the MGDRS was sensitive in 1-2m distance. The findings of the study revealed that the result was very acceptable in terms of the composition, operating performance and technical features.

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## INTRODUCTION

The way people think about waste disposal at the moment, especially in the Philippines, is rather sad. There are still a lot of individuals who don't care about the environment, which is why the rates of solid trash generation in the Philippines vary greatly (Paterson, 2024). They all know that littering is bad for us, yet the majority of people continue to dispose of their rubbish in inappropriate locations. Filipinos want to be always reminded to dispose

garbage properly. Everywhere you'd walk you'll always see trashes, big or small, along the way (Sharma and Patel, 2021).

The dustbin is a container that collects garbage or stores items which are recyclable or non-recyclable, decompose, and non-decompose. They are usually used in homes, offices, etc. The surrounding of a dustbin is also conducive to increasing the pollution level. Air pollution due to a dustbin can produce bacteria and viruses which can produce harmful life diseases for humans (World Health Organization, 2019). Therefore, the researchers designed a smart dustbin controlled by an Arduino Uno module that will perform corresponding actions on the waste to be thrown in the dustbin and open the lid with the help of the motor. This study conducted to encourage people to find ways in order to surpass the economic crisis of our country. This will also encourage the students to be resourceful and productive.

A modified garbage dustbin reminder system has a hands-free motion sensor lid that opens automatically when it notices someone approaching the dustbin to dispose of their waste (Gupta and Singh, 2020). An automated dustbin lid keeps germs and odors away from your loved ones. Ultrasonic sensors are used by the dustbin to measure the level of content and act as a signal to play the voice reminder to remind the users to throw garbage according to the kinds of waste. The LED will blink and the buzzer will alarm when the trash can is full. This type of system may help us maintain cleanliness and separate the biodegradable and non-biodegradable. Using the modified garbage dustbin reminder system users will no longer need to constantly check the contents, and they can also avoid bacteria from the bin. The modified garbage dustbin reminder system can be used in indoor areas such as classrooms, offices, homes, etc.

#### *Statement of the problem*

This study generally aimed to determine the acceptability of the Modified Garbage Dustbin Reminder System.

Specifically, it aimed to answer the following objectives:

- 1) Determine the sensitivity of the Modified Garbage Dustbin Reminder System in terms of three varying distances 1m, 2m, and 3m.
- 2) Determine the charging/discharging time of the Modified Garbage Dustbin Reminder System.
- 3) Determine the acceptability of the Modified Garbage Dustbin Reminder System in terms of composition, operating performance and technical features.

## METHODOLOGY

#### *Research design*

This study employed a developmental research design, focusing on the creation and evaluation of a Modified Garbage Dustbin Reminder System (MGDRS). Developmental research involves the design, development, and improvement of a product to assess its effectiveness and utility. The MGDRS was designed to enhance waste management practices through features such as automatic lid operation, voice reminders for waste segregation, and level monitoring using Arduino Uno technology. These features aimed to provide hands-free operation, ensure cleanliness, and promote proper waste disposal habits.

#### *Locale of the study and respondents*

The study was conducted at Capiz State University, Main Campus, located on Fuentes Drive, Roxas City. The respondents included individuals likely to benefit from the system, such as students, faculty members, and staff. Their participation was essential to evaluate the system's

sensitivity, charging/discharging time, and overall acceptability in terms of composition, operating performance, and technical features.

#### *Research instruments*

To achieve the study's objectives, various instruments were utilized, including sensitivity tests, charging and discharging trials, and surveys for acceptability. The sensitivity tests evaluated the system's response to distances of 1m, 2m, and 3m. Charging and discharging trials measured the time required to fully charge the system and its operational duration. Surveys were distributed to assess the system's acceptability based on predefined criteria, with responses interpreted using a Likert scale.

#### *Data analyses procedure*

Data analysis involved computing means to summarize the system's performance and acceptability. Sensitivity data were analyzed to determine the effectiveness of the system at varying distances. Charging and discharging data were evaluated to assess battery efficiency and operational capacity. Survey responses were averaged to determine the overall acceptability of the MGDRS across its composition, operating performance, and technical features. Results were interpreted to draw conclusions about the system's practicality and effectiveness.

## FINDINGS AND DISCUSSION

### *Dustbin reminder system*

The result implies that the modified garbage reminder system was sensitive in 1 and 2m with the mean of 1 that interpreted sensitive and in 3m with the mean of 0 that interpreted as not sensitive.

### *Charging/discharging time of modified garbage dustbin reminder system*

Data further showed a grand mean of 12.04v. The means range after charge in one hour is 11.45v and after 2 hours the mean is 12.23v and the highest mean is 12.44v. The result implies that the dustbin can fully charge in 3 hours beyond using the 1Amp charger.

### *Discharging time of modified garbage dustbin reminder system*

The result implies that the modified garbage reminder system can operate in 10hrs with have a remaining voltage of 10.54v.

### *Acceptability of modified garbage dustbin reminder system in terms of composition*

Data further showed grand means of 4.75 which was interpreted as "very acceptable". The means range from 4.11 to 5.00 which were all interpreted as "very acceptable". It implies that the composition and materials used in the device is appropriate and accurate to use.

### *Acceptability of modified garbage dustbin reminder system in terms of operating performance*

Data showed the five (5) statements, statements number 1 got the mean of 4.9 which state that "The Dustbin lid closes and opens smoothly." which was interpreted as "very acceptable". Followed by statement number 2 "Modified garbage dustbin reminder system is

sensitive in 1-2 meter distance” with the mean of 4.7 and statement number 3 “Modified garbage dustbin reminder system can fully charge at least 2-3 hours” with a mean of 4.76 which has interpreted “very acceptable” and statement number 4 “The modified garbage dustbin reminder system can operate 10hrs with a mean of 4.6 which has interpreted “very acceptable” and statement 5 with the highest mean of 4.9 also interpreted “very acceptable”. Finally, and statement 6 “The Voice reminder of the system is clear and hear able by the user” got a mean of 4.63 which has interpreted “very acceptable”. The overall mean of the Modified garbage dustbin reminder system terms of operating performance was 4.75 with a verbal interpretation of “very acceptable”.

#### *Acceptability of modified dustbin reminder system in terms of technical features*

Data further showed grand means of 4.16 which was interpreted as “very acceptable”. The means range from 4.11 to 5.00 which were all interpreted as “very acceptable”. It implies that the technical features of the modified garbage dustbin reminder system is more benefits and can helpful to the users.

## CONCLUSIONS AND RECOMMENDATIONS

The findings of the study revealed several key conclusions about the Modified Garbage Dustbin Reminder System (MGDRS). First, the system demonstrated sensitivity in detecting users within a range of 1 to 2 meters, effectively reminding them to dispose of their waste properly, while it was less sensitive at a distance of 3 meters. Second, the MGDRS was found to be efficient in terms of power usage, with a full charging time of 3 hours using a 1-amp charger and an operational duration of up to 10 hours. Additionally, the system was evaluated as highly acceptable in three critical aspects: composition, operating performance, and technical features. The composition was deemed appropriate and reliable, with quality materials and components securely assembled. The operating performance of the system, including the smooth functionality of the automatic lid and the effectiveness of the voice reminder, was also rated very acceptable. Lastly, the technical features, such as automated operation, level monitoring, and compatibility with AC/DC power supply, were found to be highly beneficial and practical for users. Overall, the MGDRS proved to be an effective and well-received innovation in waste management.

Based on the conclusions, several recommendations were proposed to enhance the use and development of the Modified Garbage Dustbin Reminder System (MGDRS). The system can be easily operated as a garbage disposal tool, promoting efficient waste management. Users are encouraged to adopt the MGDRS to facilitate faster waste separation while minimizing exposure to bacteria from the bin. Its smooth operation, including the automatic lid, makes it user-friendly and practical for everyday use. To optimize performance, the researchers recommend using a 12V 2-amp charger for faster battery charging. Additionally, the sensitivity of the system can be improved by adjusting the program codes to extend the detectable distance. Future research is suggested to explore other features that could further enhance the effectiveness, sensitivity, and acceptability of the system, using different variables to validate and expand its functionality.

## REFERENCES

Chan, J., & Erduran, S. (2024). Promoting environmental literacy through technological interventions. *Journal of Science Education*, 39(1), 15-29.

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Cherry, K. (2021). The role of environmental psychology in waste management practices. *Environmental Psychology Journal*, 19(3), 45-56.

Environmental Protection Agency (EPA). (2020). The role of automated waste management systems in reducing environmental pollution. Retrieved from EPA Website

Gupta, R., & Singh, S. (2020). Smart waste management systems: A comprehensive review. *Waste Technology & Research*, 34(2), 112-125.

Kumar, A., & Sharma, M. (2023). Development of ultrasonic sensor systems for waste monitoring. *Advances in Sensor Technology*, 22(7), 135-150.

Paterson, D. (2024). Innovative technologies for sustainable urban waste management. *Sustainable Development Journal*, 52(4), 98-112.

Robinson, D. (2022). Designing hands-free systems for hygiene improvement: Lessons from smart technologies. *International Journal of Smart Solutions*, 14(5), 85-102.

Sharma, K., & Patel, R. (2021). Smart dustbin solutions: A step toward efficient waste segregation. *Waste Management Innovation*, 25(4), 77-90.

World Health Organization. (2019). Impact of improper waste disposal on public health. Retrieved from WHO