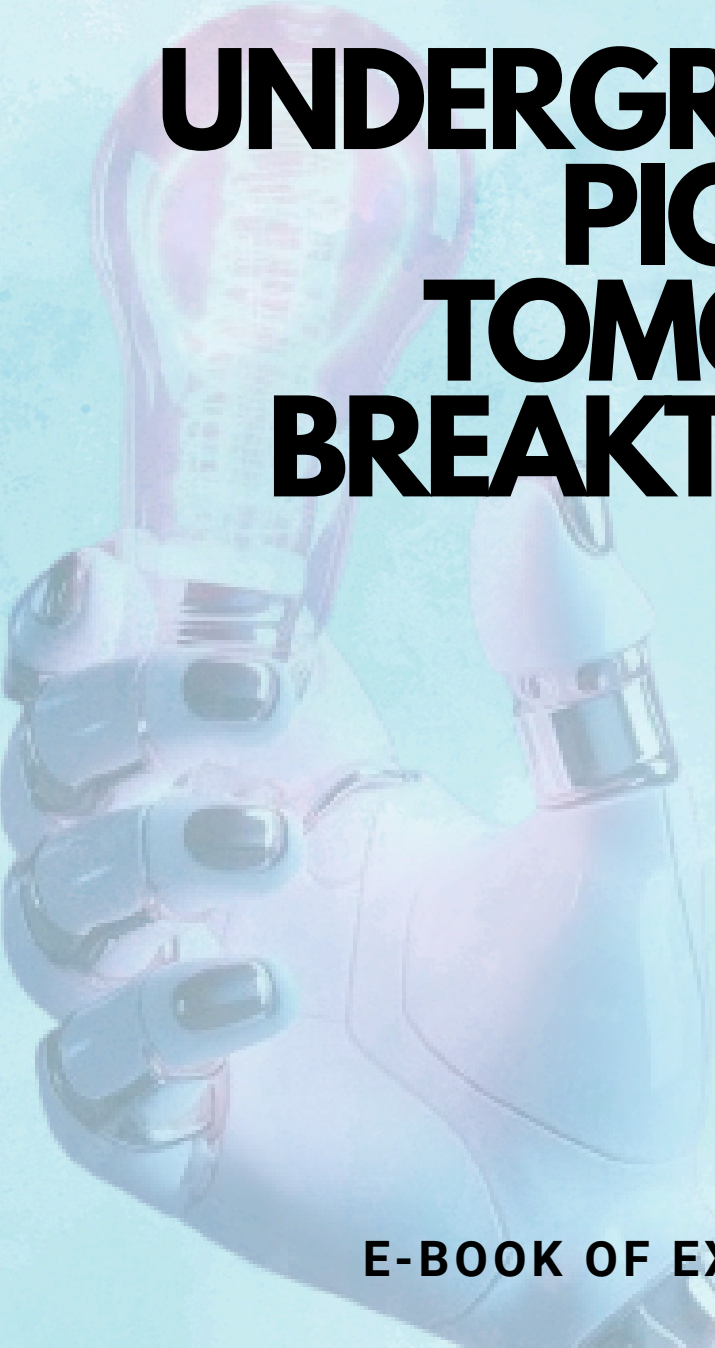




I-URIP 2025

INTERNATIONAL UNDERGRADUATE RESEARCH
INNOVATION, INVENTION AND DESIGN



UNDERGRADUATES PIONEERING TOMORROW'S BREAKTHROUGH

E-BOOK OF EXTENDED ABSTRACTS

MANUAL CLOTH WRINGER

Francesca Enchang*, Pressca Neging, Erenice Dyana Rudy, Deanrian Tiban, Catalina Rogers, and Muhammad Aziq Haikal Hafizul

Universiti Teknologi MARA Cawangan Sarawak

*francesca@uitm.edu.my

ABSTRACT

Laundry remains a persistent challenge for students living in hostels where access to washing machines and dryers is limited and electricity supply may be unreliable. Handwashing often leaves garments excessively damp, resulting in prolonged drying times and additional inconvenience. To address this issue, a Manual Cloth Wringer was developed as a low-cost and portable device designed to remove excess water from clothes without relying on electricity. The device was constructed using readily available recycled materials. PVC pipes formed the hand crank while a recycled plastic basket served as the wringer. Assembly was carried out using basic hand tools to ensure that the design remained simple, durable and easy to replicate. In operation, damp clothes were placed inside the basket, secured and manually spun using the PVC crank. The centrifugal force generated expelled water through the perforations, thereby reducing moisture content. Experimental testing demonstrated that the wringer removed a substantial proportion of excess water, enabling faster drying and requiring less physical effort compared to manual wringing. Overall, the device provides a practical, sustainable and affordable solution for students and individuals in resource-constrained environments, enhancing convenience while promoting the reuse of recycled materials.

Keywords: *Manual Cloth Wringer, Polyvinyl Chloride (PVC), Recycle, Laundry*

INTRODUCTION

Laundry is one of the most basic yet time-consuming chores of daily life, especially for students residing in hostels and dormitories. While washing machines and dryers provide convenience, they are not always accessible or affordable for students in low-resource settings. Consequently, many students rely on handwashing which often leaves garments excessively damp. Without effective wringing, drying time is substantially prolonged particularly in humid or rainy weather conditions. Moreover, inadequate wringing can damage fabric quality, cause unpleasant odors and elevate the risk of mold growth during drying.

In developing regions or in areas with unreliable electricity supply, the lack of affordable laundry solutions further exacerbates this issue. Students and low-income individuals in particular are forced to spend more time and effort on laundry, reducing the time available for academic and personal development. To address this gap there is a pressing need for a practical, low-cost and portable solution that can efficiently remove excess water from clothes without depending on electricity.

DISCUSSION

The primary objective of this project is to design, develop and evaluate an innovative Manual Cloth Wringer that provides an efficient, sustainable and affordable solution for students and individuals living in hostels, dormitories or low-income households. Specifically, Jagushte et al. (2015) state that the goals are:

- i. To create a simple laundry aid that removes excess water from clothes without electricity.
- ii. To use recycled or easily available low-cost materials to ensure affordability and sustainability.
- iii. To design the product in a compact, lightweight and portable form for use in limited living spaces.
- iv. To reduce laundry drying time and physical effort while maintaining user convenience.

The Manual Cloth Wringer is a portable hand-operated device constructed primarily from recycled and easily available components. The design uses PVC pipes as the hand-crank mechanism, offering strength, durability and ease of assembly. A recycled plastic basket serves as the wringer drum where clothes are placed for water extraction. The entire structure is assembled with basic hand tools, ensuring accessibility and ease of repair.

The operational process is straightforward. Damp clothes after hand washing are placed into the wringer basket. The basket is then secured and the user rotates the PVC hand crank to spin the basket. Through centrifugal force, water is efficiently expelled from the clothes, draining out of the basket through perforations (Pedal powered clothes washer, n.d.). The mechanism significantly reduces the amount of residual water in clothes, thereby shortening drying time.

This simple yet effective design makes the device particularly suited for small spaces, low-resource settings and student accommodations. It is lightweight enough to be portable, durable for repeated use and affordable for students with limited budgets.

The uniqueness of this project lies in its low-cost, sustainable and student-centered approach. In terms of material innovation, the use of recycled plastic baskets and PVC pipes minimises manufacturing costs, promotes environmental sustainability and ensures that the device can be built or repaired with readily available parts. Unlike electric dryers or wringers, the manual device operates without electricity, making it eco-friendly and practical in areas with limited or no electrical access (Development of eco-friendly washing machine, 2017). This is considered an energy-independent device.

From a portability and accessibility perspective, the compact size and lightweight construction allow users to carry and use the device anywhere, even in hostels or shared dormitory spaces where large appliances are impractical. This is a user-centered design wringer because of its simple hand-crank operation that requires minimal training, making it suitable for students and individuals of all age groups. Lastly, by relying on recycled and inexpensive components, the device provides a cost-effective alternative to washing machines or dryers, addressing the financial limitations of students and low-income users. This means it is an affordable innovation. This combination of features highlights the originality and social value of the Manual Cloth Wringer as a grassroots innovation that merges practicality with sustainability.

CONCLUSION

The Manual Cloth Wringer addresses an often-overlooked challenge faced by students and individuals in resource-limited environments: the need for an affordable, portable and efficient means of drying laundry. By combining recycled materials, simple mechanics and user-friendly design, the device offers a practical solution that reduces drying time, conserves energy and enhances convenience.

Its affordability, sustainability and portability set it apart from conventional laundry solutions, making it particularly beneficial in hostel and dormitory settings where access to washing machines and dryers is limited. Beyond students the device also holds potential value for low-income households, disaster relief situations and off-grid communities.

In conclusion, the Manual Cloth Wringer not only reduces the time and effort required for laundry chores but also contributes to sustainability through the use of recycled materials. As an innovation, it represents a meaningful step toward developing low-cost, eco-friendly technologies that improve everyday life for communities with limited resources.

ACKNOWLEDGEMENT

The authors did not receive any funding for this research.

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