

# POWER TTR3SS WATER PURIFIER

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## INTRODUCTION

Water is one of man's necessities. He uses it for bathing, household chores, and of course for drinking. Man needs to drink at least 8 glasses of water a day to stay healthy. Sad to say, not everyone is able to access safe and clean drinking water. There are different means of water treatment nowadays but not all of them are practical to be implemented in poor rural/urban areas. Some of these are boiling, solar disinfection, chemical treatment (uses chlorine and iodine), reverse osmosis, wells, slow sand and UV.

Reverse osmosis purifies bacteria, salts, sugars, proteins, particles, dyes, heavy metals, chlorine, and other contaminants with a molecular weight greater than 150 250 daltons. Deep wells seem like a great solution for the water problems of the rural poor. But these have major shortcomings in application. Often dug and tube wells need purification because

these may become contaminated during the rainy season. If the wells are poorly constructed or maintained, then these may be contaminated on a regular basis. UV light is a form of electromagnetic radiation and should not be confused with nuclear radiation. Ultraviolet light kills bacteria by penetrating cells commonly called DNA.

## GENERAL OBJECTIVE

The main objective is to innovate the "POWER TTR3SS WATER PURIFIER" to be more versatile and accessible.

## SPECIFIC OBJECTIVES

The Specific Objectives are the following.

1. To test the accuracy of the machine in terms of:
  - A. Automation
  - B. Water pumping

2. To test the machine if it is synchronizing with the new extension.

3. To assess the machine in terms of the following criteria:

- A. Aesthetic
- B. Functionality
- C. Durability
- D. Safety
- E. Maintenance

4. To compare if there is significant difference to the evaluation respondents. between two groups of respondents

#### **STATEMENT OF THE PROBLEM**

The questions it sought to answer are the following:

1. What is the condition of water purifying in the Philippines?

2. What are the devices that may help the innovation of the "POWER TTRESS WATER PURIFIER"

3. What are the improvements that are needed on the original machine to make it more functional?

4. What is the assessment of the two groups of respondents namely:

Community and Businessman in terms of the following criteria? Is there any significant difference?

- a. Functionality
- b. Usability
- c. Reliability
- d. Efficiency
- e. Maintainability

5. What claims can be derived from the developed system.

#### **METHODOLOGY**

There is a curious mythology about understanding and mastery of the technical aspects of research. Statistics is often called "mere statistics, and many behavioral researchers say they would use a statistician and a computer expert to analyze their data. An artificial dichotomy between problem conception and data analysis are set up (Kerlinger Pedhazur, 1973).

Statistical significance says little or nothing about the magnitude of a difference or of a relation. With many subjects, tests of significance show statistical significance even when a difference between means is quite small, perhaps trivial, or a correlation coefficient is very small and trivial. To use statistics adequately, one must understand the principles involved

and be able to judge whether obtained results are statistically significant and whether they are meaningful in the research context (Kerlinger. 19791.

Although random sampling offers the best opportunity to generalize the findings to the population, purposive sampling provides the most effective way of developing a 45 understanding of the current phenomenon under study (Marshall, 1996). In addition, purposive sampling attracts a possible element of bias, yet it is this inherent bias of the method that adds to its efficiency and robustness when tested against random probability sampling (Tongco. 2007). Purposive sampling is fundamental to the production of quality data.

Evaluation

The project was evaluated on the following criteria namely:

- Functionality
- Usability
- Reliability
- Efficiency
- Maintainability

Statistical Treatment

The mean was used as the tool for evaluating the project.

The formula is:

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$$X = \frac{\sum X}{N}$$

Where,

$\sum$ , represents the summation

X, represents scores

N, represents number of scores

The Likert Scale was used for descriptive ratings.

Table 1: Likert Scale for descriptive ratings.

Numerical Scale	Average Response	Descriptive Rating	Verbal Interpretation
5	4.20-5.00	Excellent/ Highly acceptable	HA
4	3.40-4.19	Acceptable	A
3	2.60-3.39	Moderately Acceptable	MA
2	1.80-2.59	Least Acceptable	LA
1	1.00-1.79	Not Acceptable	NA

a = 0.05

Statistical Computation

Then in the statistical tool the researcher used the statistical method called "ANOVA" (Analysis of Variance). The ANOVA tests the null hypothesis where samples in two or more groups are drawn from populations with the same mean values. To do this, two estimates are made of the population variance. These estimates rely on various assumptions.

The ANOVA produces an F-statistic, the ratio of the variance calculated among the

means to the variance within the samples. If the group means are drawn from populations with the same mean values, the variance between the group means should be lower than the variance of the samples, following the central limit theorem. A higher ratio therefore implies that the samples were drawn from populations with different mean values.

#### **DATA GATHERING PROCEDURE**

1. Deciding the title of the thesis "PowerTtr3ss Water Purifier."
2. Gathering data through research.
3. Presentation of the proposed title.
4. Designing the project's structure and circuitry.
5. Deciding on where the researchers will construct their design project.
6. Collection of materials and equipment that would be used for the whole project.
7. Construction and wiring the project.
8. Testing and trial of the output.
9. Writing the final report of the thesis.

10. Final defense of the study.

11. Final checking of the output.

12. Submission of the final report.

#### **SUMMARY OF FINDINGS**

**SOP1.** What is the condition of water purifying in the Philippines?

- Considered Department still in Good Condition, Health accredited the Bombs laboratories to test water sample though water source condition in the Philippines facing various problems on water use and distribution leading to water scarcity in different areas in the country.

**SOP2.** What are the devices that may help innovation of the "POWER TTR3SS WATER PURIFIER?"

- The machine POWER TTR3S Water Purifier is a splendid machine but it can be improved with the addition of some feature to the system:
- Addition of water pump It helps boost the speed of the process of filtering the water which also help sucks the water from source to the machine.

- Additional sensors and arduino More sensors and arduino to make the system more automatic.
- Alternate power source with the addition of alternative source like solar panel, it would be more efficient and it would not be dependent on plug power source.

**SOP3.** What are the improvements that are needed on the original machine to make it more functional? the

The original machine still has more improvements to do is how:

- Another body part to the machine For the machine to be improved more, it needs to have an external part. It has no more room in the original so needs another external part.
- Additional Storage. The original machine can only serve about 10 people before refilling it again, which will take 10 to 15 minutes. But in the improved version, it can serve 50 to 60 persons and can refill water without waiting anymore.
- Removal of faucet. replacing it with an automatic 11 output water

With the help of additional sensors and arduino, the machine can have an output of IL with the help of a push button. No more waiting for the water to be full, just push the button and it will have an output of IL of purified water.

**SOP4.** What is the assessment of the two groups of respondents namely: Community and Businessman in terms of the following criteria? Is there any significant difference?

- Functionality
- Usability
- Reliability
- Efficiency
- Maintainability

Table 2: Overall Assessment of Two Groups of Respondents

Variables	Varian ce	WM	Varian ce	WM	t-value	t- critic al	Int	Decision
1 Functionality	4.58	0.01	4.22	0.02	3.58	2.78	NS	Reject Failed to
2 Usability	4.40	0.08	4.20	0.01	0.95	4.30	NS	Reject Failed to
3 Reliability	4.33	0.01	4.23	0.00	1.34	4.30	NS	Reject Failed to
4 Efficiency	4.29	0.01	4.16	0.00	2.12	2.78	NS	Reject Failed to
5 Maintainability	4.44	0.01	4.18	0.01	3.62	2.78	NS	Reject Failed to

Df =28, Level of Significance = 0.5, two tailed

Table 2 shows the summary on the significant difference on the respondent's assessment on the above cited criteria.

On the criteria "Functionality", the computed t-value of 3.58 is less than the t-critical of 2.78. The hypothesis is rejected; therefore, there is significant difference in the

assessment of the two groups of respondents.

Furthermore, on the criteria "Reliability", the computed t-value of 1.34 is less than the t-critical of 4.30 the hypothesis is failed to reject; therefore, there is no significant difference in the assessment of the two groups of respondents. In addition, on the criteria Efficiency", the computed t-value of 2.12 is less than the t-critical of 2.78. The hypothesis is failed to reject; therefore, there is no significant difference in the assessment of the two groups of respondents.

Likewise, on the criteria "Maintainability", the computed t-value of 3.62 is less than the t-Critical of 2.78. The hypothesis is rejected; therefore, there is significant difference in the assessment of the two groups of respondents.

**SOP 5.** What claims can be introduced from their innovative machine?

The following claims were derived in the developed system:

- a. An additional external machine to improve the current machine.
- b. A solar panel for an alternative power as well as being independent on plug-on power.

- c. Removal of faucet and replacing with automatic 1L output of purified water.
- d. Additional storage for more people to serve.
- e. Water pump for more efficiency and more capabilities of the machine.

## CONCLUSION

This study was taken with the main objective to develop a Power TTR3SS Water Purifier that enhances the common one existing in the market. Specifically, this study aimed to achieve the following:

Design and construct Power TTR3SS Water purifier:

- Perform try out and revision;

Determine the acceptability of the machine using the following criteria:

- Functionality
- Aesthetic
- Workability
- Durability
- Safety and Maintenance

Determine the significant difference on the evaluation made by the respondent students, business owners and family with

respect to the above cited criteria on the comparison conducted between the Power TTR3SS Water Purifier and that existing one in the market.

Based on the findings of the study, conclusions are drawn: the following

1. Frankly speaking, the world is on the brink of a global crisis as the global population rises and so does the demand for water which puts pressure on the planet's finite supply. Add to the scarcity the fact that we're polluting what little people have left.

2. The pH (Potential of Hydrogen), Conductivity/ dissolved solids and Turbidity/suspended solids which are the devices that are currently used to measure water parameters but only in laboratory testing for drinking water. While pH (Potential of Hydrogen) and Turbidity/suspended solids are the devices used in the POWER TT3SS WATER PURIFIER.

3. POWER TTRESS WATER PURIFIER a compact water refilling machine so it can easily move or bring in other places. Aside from it being portable, the 87 materials used are guaranteed safe and clean, specifically the 5-stage water purifier and the bacteria killing tool, the UV light.

4. Current refilling station needed bigger space or a room to set-up the machine. In terms of

waste water, there is a 40/60 percentage (40% clean and drinking water and 60% for waste water). There is more waste water than clean water to produce.

5. The proponents constructed the design using high quality stainless steel to become rust proof and performed a try out and revision to test the workability of the desired output of the design. Based on the findings as to the level of acceptability of the researchers very own Power TTR3SS Water Purifier, the hypothesis that there is no significant difference in the level of acceptability of the three groups of respondents with respect to its functionality, aesthetic, workability, durability, safety, and maintenance was extremely accepted was affirmed.