AUTOMATIC UV LIGHT DISINFECTION MACHINE

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INTRODUCTION

Personal protective equipment (PPE), including surgical masks and face shield, is crucially important to the safety of both patients and medical personnel, particularly in the event of infectious pandemics. As the incidence of Coronavirus Disease (COVID-19) is increasing exponentially in the Philippines and worldwide, healthcare providers demand for these necessities is currently outpacing supply. As such, strategies to safely expand the lifespan of the supply of medical equipment are critically important. Some hospitals have already begun using UV-C light to sterilize N95 respirators, but many lack the space or equipment to implement existing protocols.

In this study our main mission is to provide support to healthcare organizations that are looking for alternative methods to extend their reserves of PPE. To alleviate the PPE shortage is to providing a way to sterilize PPE to allow safe daily re-use. This method would be preferred compared to re-use without sterilization.

According to a scientist at Columbia University, FAR UV-C is effective against SARS-CoV-2, the virus that causes COVID-19. FAR UV-C (also called germicidal UV is a part of the ultraviolet spectrum that can inactivate pathogens like bacteria and viruses. It utilizes specific wavelengths of the ultraviolet spectrum, typically between 207 to 222 nanometers. UV causes photochemical in DNA and RNA resulting to inactivation of microbes and failure to reproduce.

Viruses are not technically living organiams, so germicidal UV technically "inactivates viruses. It is very efficient in times of COVID-19 since it can live on certain surfaces for up to three days and can travel through the air. Therefore, germicidal UV is a great tool to disinfect air and surfaces. By using this as an advancement of disinfection through face shield, it can greatly help to lessen the threat of spreading the COVID-19.

GENERAL OBJECTIVE

The main objective of this project was to To Have a project that will surely lessen the much consumption of face shield by recycling it through disinfection and to ensure the safeness and efficiency of the product to user making sure of 99.9% secureness of killing the viruses To prevent and mitigate the spread of the virus.

STATEMENT OF THE PROBLEM

This project aimed to build proposed Automatic Far UV-C Light Disinfection Machine. It sought to answer the following research questions:

1. Who is the beneficiary of this project?

2. How can it help in Medical Aspecta?

3. What sources of electricity are going to use?

4. What is the assessment of the two groups of respondents namely: Students and E-bikers

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

    a. Functionality

    b. Usability

    c. Reliability

    d. Efficiency

    e. Maintainability

METHODOLOGY

The research used the developmental type of research which as opposition easy educational development, has been outlined because the systematic study of coming up with, developing, and evaluating educational programs, processes, and product that has got to meet criteria of internal consistency and effectiveness. Developmental research is especially vital within the field of educational technology. The foremost common forms of organic analysis involve things during which the product-development process is analyzed and delineated, and also the final product is evaluated. A second kind of organic process analysis focuses a lot of on the Impact of the merchandise on the learner or the organization. The 3rd kind of study is familiarized toward a general analysis of style development or analysis processes as an entire or as parts. A basic distinction ought to be created between reports of actual organic process analysis (practicel and descriptions of style and development procedural models (theory). Though it's often been misunderstood, organic process analysis has contributed a lot of to the expansion of the sector as an entire, usually serving as a basis for model construction and theorizing.

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:

$$X = \frac{\Sigma x}{n}$$

Where,

Σ, represents the summation

X, represents scores

N, represents number of scores

The Likert scale was used for descriptive ratings.

Table 1.

Numerical Scale	Average Respone	Descriptive Rating	Vebal Interpretation
5	4.20 – 5.00	Excellent	E
4	3.40 – 4.19	Very Good	VG
3	2.60 – 3.39	Good	G
2	1.80 – 2.59	Fair	F
1	1.00 – 1.79	Poor	P

Equal Variance Not Assumed

When the two independent samples are assumed to be drawn from the populations with equal variances (i.e., O12 022), the test statistic t iS computed where:

X--1 = Mean of the first sample

x--2 = Mean of the second sample

n1 = Sample size (i,e., number of observations) of first sample

n2 = Sample size (i.e., number of observations) of second Sample

1 = Standard deviation of first sample

s1 = Standard deviation of second sample

The calculated t value is then compared to the critical t value from the t distribution table with degree of freedom.

Data Gathering Procedure

1. Deciding the title of the thesis, Automatic FAR OV-C Light Disinfection Machine.

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

This chapter shows the findings resulting from the study of Automatic UV-C Light Disinfection Machine

SOP 1. Who is the beneficiary of this project?

The people in highly infected rate areas are the number one benefactor of this project where the disinfection of PPES (personal protective equipment's) is greatly needed for our frontline workers or in everyday use. It can also help to inform the other people the importance of proper disinfecting PPEs and to help lessen the spread of viruses.

SOP 2. How can it help prevent infections?

UV-C radiation is a known disinfectant for air, water, and nonporous surfaces. UVC radiation has effectively been used for decades to reduce the spread of bacteria, such as tuberculosis, SARS and more.

SOP 3: What energy source can be use?

We use standard home power outlet (220V).

SOP 4. WHAT IS THE ASSESMENT OF THE 3 GROUPS OF RESPONDENTS NAMELY: STUDENTS, PROFESSIONAL AND COMMUNITY TO AUTOMATIC UV-C LIGHT DISINFECTION MACHINE IN TERMS OF CRITERIA? IS THERE ANY SIGNIFICANT DIFFERENCES?

The following criteria were being assessed by group of three respondents students, professional and community.

Table 2: Overall Assessment of Two Groups of Respondents

Criteria	Students	Professor	Community	Composite Mean	VI	RANK
Functionality	4.17	4.17	4.27	4.20	VS	3
Usability	4.50	4.50	4.50	4.50	VS	1
Reliability	4.45	4.45	4.45	4.45	VS	2
Efficiency	3.40	4.07	4.07	4.17	VS	5
Maintainability	3.63	4.23	4.23	4.33	VS	4
Overall Composite					**VS**	

Table 2. shows the result of the overall assessment of the three groups of respondents, namely: Students, Professionals and Community. The overall composite mean has a numerical value of 4.48 interpreted as "Very Satisfactory"

A. ASSESSMENT ON FUNCTIONALITY AND EFFICIENCY

Rank 2.5 452 Functionality and "Efficiency with composite means of 4.52 and interpreted as "Very Satisfactory".

B. ASSESSMENT ON USABILITY

Rank 1 is "Usability "with a composite mean of 4.55 and Interpreted as "Excellent ".

C. ASSESSMENT ON RELIABILITY

Rank 5 is "Reliability "with a composite mean of 4.33 and Interpreted as "Very Satisfactory".

D. ASSESSMENT ON MAITAINABILITY

Rank 4 is "Maintainability "with a composite mean of 4.46 and interpreted as "Very Satisfactory".

CONCLUSION

A. According to the evaluation result of functionality of the system, the degree to which the sets functional completeness, correctness and appropriateness were Interpreted as "Very Satisfactory" by the respondents, which means that the functionality of Smart Face Shield with Emergency Features using AUTOMATIC UV-C LIGHT DISINFECTION MACHINE provided the specific tasks and user objectives, correctness of results with the needed degree of precision, and facilitated the accomplishments of the specified task and objectives.

B. According to the evaluation result of the usability of the system, the degree to which the sets operability and accessibility were interpreted as "Excellent" by the respondents, which means that the usability of Smart Face Shield with Emergency Features using AUTOMATIC UV-C LIGHT DISINFECTION MACHINE had an attribute that make it easy to operate and control and can be used by the people with widest range of characteristics and capabilities to achieve a specified context of use.

C. According to the evaluation result of the reliability of the system, the degree to which the sets maturity and availability were interpreted as "Very Satisfactory" by the correspondents, which means that the reliability of AUTOMATIC UV-C LIGHT DISINFECTION MACHINE has met the needs for reliability under normal operation and it was operational and was accessible when required for use.

D. According to the evaluation result of the efficiency of the system, the degree to which the sets time behavior, resource utilization and capacity were interpreted as "Very Satisfactory" by the respondents, which means that the efficiency of AUTOMATIC UV-C LIGHT DISINFECTION MACHINE met the requirements of performing its functions.

E. According to the evaluation result of the maintainability of the system, the degree to which the sets modularity, reusability and modifiability were interpreted as "Very Satisfactory" by the respondents, which means that the maintainability of AUTOMATIC UV-C LIGHT DISINFECTION MACHINE was composed of discrete components such that a change to one component had minimal impact on other components, an asset can be used in more than one system, or in building other assets and can be effectively and efficiently modified without Introducing defects or degrading existing system quality.

RECOMMENDATION

To fully developed the quality of our study, we highly recommend the future worker/developer of the same project in the best way possible,

> For the development/Innovation of the study for the succeeding researchers, explore more on other disinfecting ways to put into the machine Internet of Things into the UV-C Light Disinfecting Machine Putting thermo sensor for monitoring heat from the inside.