

EFFICACY OF THE INTEGRATED SCREENING SYSTEM FOR A RAPID AND ACCURATE COVID-19 PREVENTION MANAGEMENT PROCEDURE

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ABSTRACT. *This study aimed to determine the efficacy of the developed Integrated Screening System for a rapid and accurate COVID-19 Prevention Management Procedure. It aimed to assess the efficacy of the system in terms of the overall time consumed during the ISS operation compared to the usual traditional practice administered during the pandemic, the accuracy of the temperature reading of the ISS compared to the commercially available temperature sensing device, and accuracy of the decoded information from the generated QR Code. The study applied the descriptive research method. The Integrated Screening System is of quality to be used by establishments during a pandemic for rapid and accurate COVID-19 prevention management procedures.*

Keywords: Covid-19 mitigation, Efficacy, Electronics, Integrated screening system, Prevention

1. INTRODUCTION

The Philippines is contending with one of the worst COVID-19 outbreaks in southeast Asia. Furthermore, the pandemic has heavily hit the country in multiple ways. As an archipelagic government made up of more than 7000 islands, the Philippines is among the most vulnerable countries in the world to natural disasters. In addition, the longstanding battle with infectious diseases has been compounded by the rise in non-communicable diseases due to lifestyle changes and an increase in risk behaviors [1].

WHO (2020) added that the best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes, and how it spreads. With the increasing number of suspected or symptomatic individuals to be tested for COVID-19, there has been a need for a safe and efficient screening system [2].

The development of the Integrated Screening System (ISS) will help slow down the transmission of the virus by restricting a symptomatic person from entering an establishment [3]. It can effectively restrict an infected or suspected person from entering premises, viz., an office, a public place, or any establishment where people may gather around to control the spread of the virus at least to some substantial extent [4]. Ensuring the quality of its performance will provide confidence in using the system.

Objectives of the study

The study aimed to identify the efficacy of the Integrated Screening System.

Likewise, it sought to determine the following:

1. The efficacy of the Integrated Screening System in terms of:
 - 1.1 Overall time consumed during the ISS Operation compared to the usual traditional practice administered during the pandemic (not using an integrated screening procedure);
 - 1.2 Accuracy of the temperature reading of the ISS compared to the commercially available temperature sensing device; and
 - 1.3 Accuracy of the decoded information from the generated QR Code.

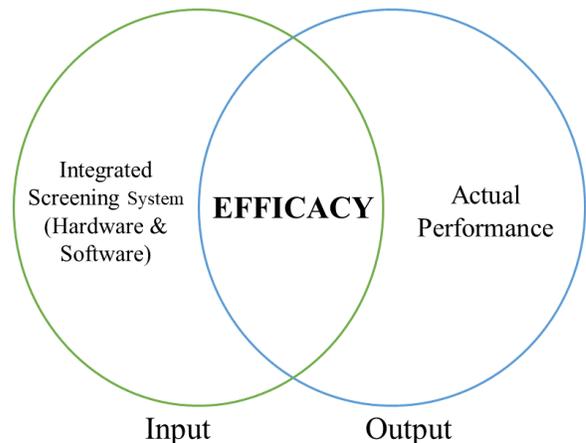


Figure 1. The Framework of the Study

Developmental Framework

This section presents the direction of the study. Figure 1 shows the framework of the study. In determining the efficacy of the Integrated Screening System (ISS), the study adopted the ACT’s Efficacy framework [5].

Efficacy refers to the success in attaining pre-determined goals. Once the project is complete, one of the results – the product produced – possesses a quality that has the potential to lead to an effective outcome [6]. The green circle represents the developed integrated screening system that will serve as the input variable in the study. In contrast, the blue circle represents the actual performance that will serve as its output variable. Joining the processes lead to determining its efficacy.

2. METHODOLOGY

Research Design

The study implored the descriptive research method. The descriptive method is appropriate for identifying the characteristics, frequencies, trends, and categories. Furthermore, it involves gathering data that describe events and then organizing, tabulating, depicting and describing the data collection [7][8][9]. The study used this method to describe the efficacy of the integrated screening system concerning its parameters mentioned in the study's objectives. In addition, the study utilized quantitative research and qualitative research to analyze data for descriptive purposes [10].

3. RESULTS AND DISCUSSION

The Efficacy of the Integrated Screening System

The study conducted several simulations and actual experiences of the ISS to evaluate its efficacy.

Table 1. Overall time consumed during the ISS Operation compared to the usual traditional practice administered during the pandemic (not using an integrated screening system)

No. of experience on the ISS	Time Covered (s) of ISS	Usual Practice
1	30 seconds	25 – 30 seconds (with human intervention)
2	12 seconds	Temperature Check – 5 seconds
3	20 seconds	Alcohol – 5 seconds
4	12 seconds	Manual Writing for Contact Tracing – 10 seconds
5	12 seconds	Present ID / Vaccine Card – 5 seconds
6	12 seconds	
7	12 seconds	
8	18 seconds	
9	12 seconds	
10	12 seconds	
11	12 seconds	

Average Time: 14.09 seconds

Table 1 showed the overall time consumed during the ISS operation, including facial recognition, QR code scanning for contact tracing, temperature reading, and automatic alcohol dispensing, compared to the usual traditional practice administered during the pandemic. The results revealed that the Integrated Screening System only takes an average time of 14.09 seconds compared to the regular practice done by the business establishments with a human intervention covering 25 – 30 seconds which implied that the Integrated Screening System provided the shortest time of the process. The result is a good indication for the rapid identification of the symptomatic COVID19 patients, isolation of cases, and appropriate contacts to reduce the onward spread and understand critical risks and modes of transmission [11]. Meanwhile, the 30 seconds record is caused by the difficulty of the participant of the study to present the QR code in the camera for scanning, which is an uncontrolled variable of the integrated screening system.

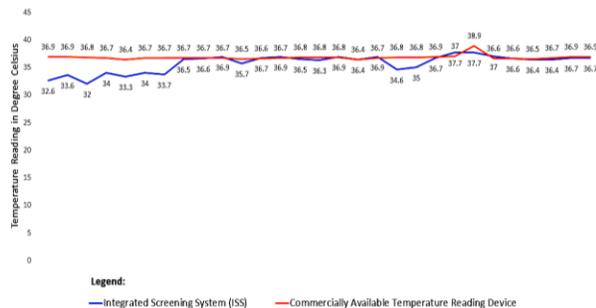


Figure 2. Accuracy of the temperature reading of the ISS compared to the commercially available temperature sensing device

Figure 2 above presented the accuracy of the temperature reading of the ISS compared to the commercially available temperature sensing device. The blue line represents the

Integrated Screening System, while the orange line represents the commercially available temperature reading device. The study took temperature readings in Degree Celsius (°C). After a series of simulations and calibration, as shown above, the ISS provided temperature reading results of 0.1 – 0.2 reading difference compared to the commercially available temperature reading device, which implied that the ISS could produce close to accurate temperature readings.

Table 2. Checklist Analysis of the accuracy of the actual QR code scanning of the Integrated Screening System

No. of actual QR Code Scanning of the ISS	Detects QR Code	Decoded the right information	Remarks
1	✓	✓	Accurate
2	✓	✓	Accurate
3	✓	✓	Accurate
4	✓	✓	Accurate
5	✓	✓	Accurate
6	✓	✓	Accurate
7	✓	✓	Accurate
8	✓	✓	Accurate
9	✓	✓	Accurate
10	✓	✓	Accurate
11	✓	✓	Accurate

Table 2 illustrated the checklist analysis [12][13] of the accuracy of the actual QR code scanning of the Integrated Screening System. The data revealed that the system generated accurate results after eleven (11) precise QR code readings [14], which implied that the ISS is accurate. The study supported a screenshot of the actual reading of the ISS for the study, see figure 3.

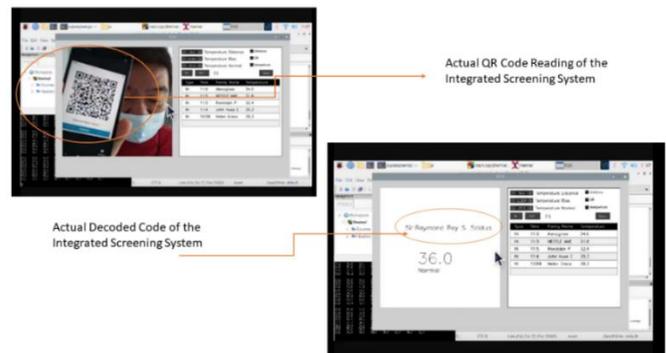


Figure 3. The screenshot of the actual QR code scanning of the Integrated Screening System

4. CONCLUSION AND RECOMMENDATION

Conclusion

Based on the study results, the integrated screening system’s efficacy broken down into different parameters delivered good results, which showed that the system had met the expected quality. The integrated screening system is of quality to be used by establishments during a pandemic for rapid and accurate COVID-19 prevention management procedures.

Recommendations

Since the Integrated Screening System showed a potential for rapid and accurate COVID-19 prevention management procedures, implementing the system in public or private establishments is recommended.

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