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Development and Effectiveness of E-Quarantine Pass and Contact Tracing System

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ABSTRACT

This project study aimed to create an electronic quarantine pass with contact tracking capabilities for San Carlos City, Pangasinan. It is with the primary purpose of securing individuals, particularly those on the front lines, in the distribution of quarantine passes, which is done manually to those who are supported in purchasing their supplies. This pandemic, particularly the rapid spread of the Corona Virus, has altered everyone's ability to live normally. Thus, this manual distribution of Q-Pass can be elevated to a more secure, safe, and efficient manner via the system that the developers devised, just in time for the new-normal stratagem, and this humble project study will aid the community and front-line responders in mitigating the perilous virus-disease. The researcher used the Agile Scrum Methodology while developing the system since it supports quicker product development by assigning each sprint a set of targets to achieve. To demonstrate the system's dependability, the developers performed user tests and used the Liker Scale to assess the system's reliability. The reliability score of 4.026 indicates that the system is very easy to use and is prepared for deployment and use. Finally, the system has a significant impact on its implementation in San Carlos City, Pangasinan because it will provide enormous assistance to the entire community, particularly to the frontliners, because they will no longer be exposed to people carrying the virus and will be able to reduce the risk of infection and possible spread to other people. This approach ensures that everyone is very secure in all commercial transactions inside the community.

Keywords: E-Quarantine Pass, Contract Tracing, Pandemic, Covid 19 Virus

INTRODUCTION

One of the most critical lessons learned from this epidemic is the notion of quarantine pass. The Quarantine Pass is used to isolate those who may have been exposed to covid-19 from others and limit the movement of individuals exposed to a contagious illness to determine whether they get ill. These individuals may have been exposed to sickness but are unaware of it and are unaware of the coronavirus disease 2019 symptoms. In March 1918, the United States of America suffered a pandemic epidemic known as Spanish influenza flu or H1N1. This virus is like the one that we are

now facing, covid19. Today, the Spanish influenza is swiftly spreading across Philadelphia and its surrounds; in the 48 hours ending at lunchtime, the board of health received 5,561 new cases. To combat the pandemic threat, they enforced quarantine on all family members.

The quarantine permit may assist in preventing the spread of coronavirus illness, 2019, which can occur before an infected individual exhibits a warning sign. Individuals placed under quarantine should remain at home, isolate themselves from others, check their health, and adhere to the state or local health department's instructions. The purpose of quarantine is to avoid exposing or contaminating others with viruses and to prevent their spread.

Contact with others, particularly those who are at a greater risk of contracting covid19. The quarantine includes a set of guidelines that we must follow; the first is the ECQ, which will be applied in our nation for the first time in March 2020. During ECQ (enhance community quarantine), the most rigorous kind of quarantine, persons are required to remain at home 100 percent of the time. Only one family member has been provided with a quarantine permit. may go out and purchase their daily needs. Second, under the GCQ (general community quarantine), everyone under the age of 21 and anyone over the age of 60 is required to stay at home since the a greater risk of contracting covid19.

Contact tracing is the process of identifying, analyzing, and managing individuals exposed to coronavirus illness 2019 to avoid further transmission. Contact tracing breaks the chains of transmission of covid-19 and is a critical public health tool for viral control when used consistently. Contact tracing is the process of manually identifying individuals who have been infected with a virus. To discourage individuals from leaving, the LGU (local government unit) imposed a quarantine id on one household member allocated to go out and get essentials. If quarantine does not pass, all establishments in San Carlos City, Pangasinan, will enforce a no-entry policy. The benefit of contact tracing frontliners is that they are aware that every person who enters the institution is being tracked. The problem with manual contact tracing is that everyone is holding a pen, which is unwise given that no one knows who was infected with coronavirus sickness in 2019. You may get contaminated. Occasionally, writing on paper requires a lengthy line, which is not recommended since the social separation is not fulfilling.

OBJECTIVES OF THE STUDY

The objectives of this study are (1) to develop a system capable of easily tracking individuals or users who are infected with the covid-19 virus, (2) to provide an electronically generated quarantine pass via QR code, (3) to avoid long queues and direct/indirect contact when entering establishments, and (4) evaluate the system's effectiveness and efficiency.

MATERIALS AND METHODS

This research includes a collection of methodologies, processes, concepts, and ideas that emphasize the system's unique characteristics. It details the requirements for obtaining an Electronic Quarantine Pass with Contact Tracing System in San Carlos City, Pangasinan.

Data Analysis

According to the Oxford definition, is the capacity to move rapidly or swiftly. The primary benefit of the agile Scrum process is its adaptability. The Scrum group gets frequent input from stakeholders after each sprint using the sprint-based show. If an issue or a change occurs, the scrum team may simply and rapidly inform the result objective for ensuing sprints to give further meaningful iterations. Agile Scrum is a method for planning and managing software development that is based on incremental development. Each iteration, which lasts two to four weeks per sprint,

may be prepared in such a way that it enables a group to manage a system more productively by breaking it down into a few stages, each of which allows for continuous collaboration with stakeholders to promote continuous improvement at each stage.

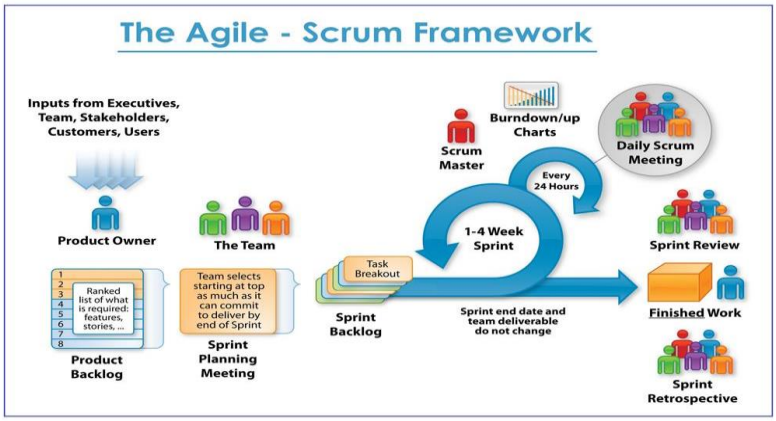

Figure 1 Agile Scrum Framework

Agile Scrum. It is one of the Agile concepts; it is a framework that may be used to construct basic, sophisticated, or complex software. It is built on current product and process improvements. If there is an issue, it will manifest itself throughout system development, and in the software that is regularly delivered utilizing scrum. Scrum projects go via a series of iterations dubbed sprints. Each sprint is a minimum of two weeks in duration and a maximum of four weeks. It is built on top of the inspect adaptive cycle. By progressively and iteratively developing a product, the risk is reduced, and visibility is increased. (2017) (Michael James and Luke Walter).

Product Backlog. It refers to the development team's prioritized list of tasks produced from the roadmap and its requirements. The most critical items are shown at the top of the product backlog, indicating which things should be delivered first. For system development in the product backlog. It is arranged in such a way that the scrum team's value is maximized. Sprint review is a term used in the product backlog to describe the process of inspecting and adapting product features as well as receiving input on product development. The scrum team, scrum master, product owner, and stakeholder are all members of this group. The scrum master's role is to safeguard the team and enhance its effectiveness.

Sprint Backlog. It refers to the collection of things from the product backlog that a cross-functional product team chooses to focus on during the forthcoming sprint. Typically, the team will resolve these issues during its sprint planning session.

Product Increment. This term refers to the total of all product backlog items accomplished during a sprint and the value of preceding sprint increments. After a sprint, the new increment must be completed, which implies that it must be usable and conform to the scrum team's definition of "Done."

Scrum Team. It refers to the sprint cycle in which the product owner, scrum master, and development team collaborate. These individuals are responsible for a variety of tasks and responsibilities associated with the product's delivery. Scrum refers to this group as a self-organizing, cross-functional one. Each scrum team's self-management determines how the group will operate. Each component is equally significant in this group; there is no hierarchy, but responsibilities are clearly defined.

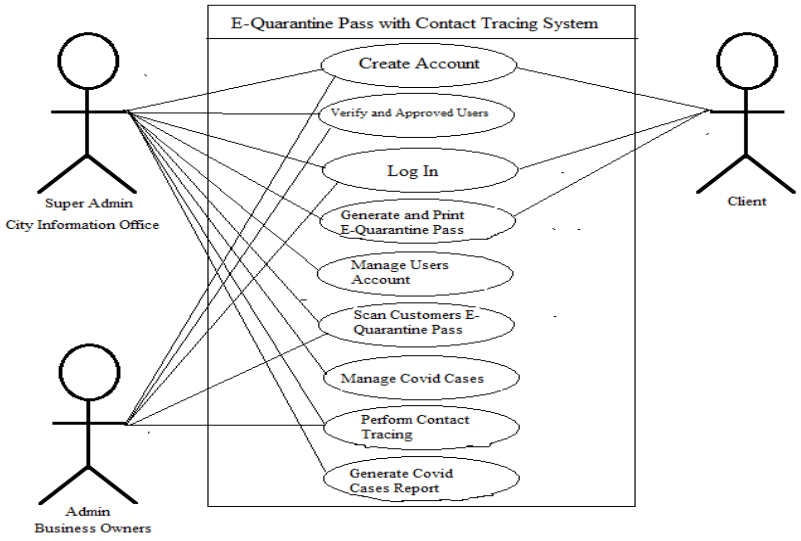

Figure 2. Use Case Diagram

The data flow diagram in Figure 2 illustrates the system's data flow; the researcher created three user levels to finish the system. Additionally, it displays the system's content, which you may utilize after the system is implemented.

Statistical Tools

Statistics is one technique for organizing data. To get a broad perspective on the study's overall situation, a statistical technique is applied. This includes the scale mechanism, which the creators utilized to assess how respondents perceive data. The Liker scale was used to analyze survey questions. These replies are based on the responses of the respondents. The five-point scale's range and interpretation are presented below.

Table 1. The Five-Point Liker Scale

Scale	**Range**	**Interpretation**
5	4.6 – 5.0	Strongly Agree
4	3.7 – 4.5	Agree
3	2.8 – 3.6	Neutral
2	1.9 – 2.7	Disagree
1	1.0 – 1.8	Strongly Disagree

The weighted mean was used to determine the overall answer of the survey samples, regardless of whether they agreed or disagreed with a specific statement. The weighted mean is calculated using the following formula:

Wherein

X – Mean

f – Weight is given to each respondent

x – No. of respondents

n – Total number of respondents

Mean

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

RESULTS AND DISCUSSION

Track Individual Users Positive with Covid-19 Infection Virus

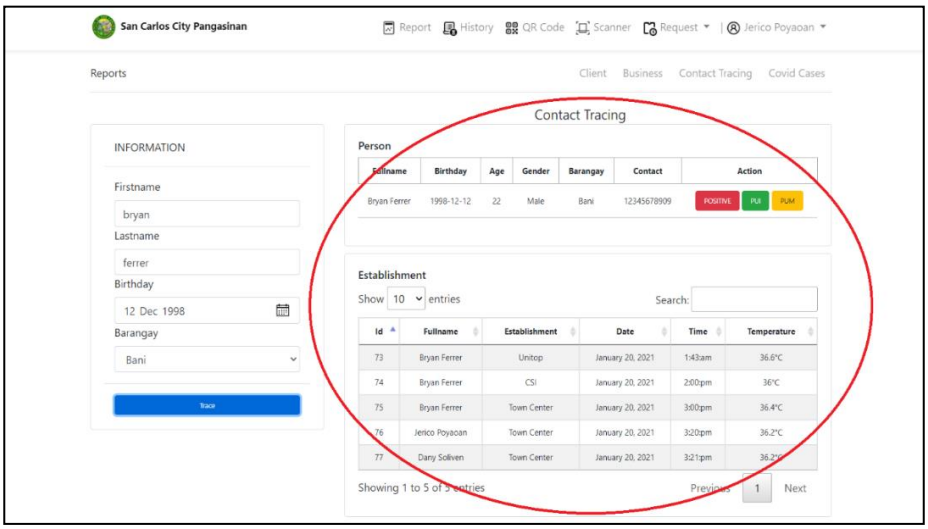

Figure 3. Contact Tracing Report

Figure 3 displayed the contact information for the person you were tracking. Notifying persons that they may have been exposed to covid-19 and instructing them to self-separate if they have covid-19 or to self-isolate if they are in close contact.

The Website Analysis and Measurement Inventory collects data on user satisfaction by inquiring about your system from visitors. Usability was also utilized to ensure that it can do the needed duties in real-world circumstances, as specified. The primary goals of this project have been met. Additionally, this project, which required the design and implementation of a computerized grading system, demonstrated a more effective method of software and hardware architectural integration for interfacing. The descriptive and developmental survey methods were used to assess in terms of presentation, information, security, and efficacy. Respondents or users responded to questions presented through interviews and questionnaires such as evaluation forms.

The usability test is used to evaluate the functioning of an adapted scheme after the development stage. The developer used the standardized WAMMI to ensure the system's acceptance. The table

summarizes user input on learnability, the efficiency of usage, user happiness, dependability, and recall ability. A Liker Rating Scale of one to five was employed to provide significant context for the ordered numerical data. The Liker rating scale is as follows: 1 for severely disagree, 2 for disagree, 3 for satisfied, 4 for agree, and 5 for highly agree.

Learnability. This refers to a software product's capacity to teach the user how to use it. Learnability is a subset of usability and is a critical factor in the design of complicated software programs.

The Efficiency of Use. This metric indicates how quickly the design and software product can complete tasks.

User Satisfaction. This relates to how enjoyable it is to use the design and is often used as a proxy for the success of an information system.

Reliability. This term refers to the possibility that a system, comprising all hardware, firmware, and software, will execute adequately the purpose for which it was built or intended, within a specific time and environment.

Remember Ability. This refers to the ease with which users may re-establish competence after a period of inactivity/

The criteria for evaluating a system's learnability are listed in Table 2. Learnability refers to the time during which people get acquainted with a system. According to the table, the greatest weighted mean of learnability is 3.66, while the lowest is 3.42.

Table 2. System Evaluation for Learnability

Learnability	Mean	Description
The system does not need more introductory Explanations.	3.64	Agree
Learning to find my way around this system is not a problem.	3.66	Neutral
Utilizing this grading system for the first time is easy.	3.42	Neutral
Remembering where I am on this system is not difficult.	3.48	Neutral
Quickly understand the process of this system.	3.48	Neutral
Total Average Mean	3.54	Neutral

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

Shows in table 3, the System Evaluation Criteria for Efficiency of Use data, the greatest weighted mean for efficiency of use is 3.88, while the lowest weighted mean is 3.44.

Table 3. System Evaluation Criteria for the Efficiency of Use

Efficiency of Use	**Mean**	**Description**
• t is not difficult to move around the system.	3.7	Agree
•	3.64	Agree

can quickly find what I want on this system.		
• he system is fast and responsive.	3.68	Agree
• feel efficient when I'm using this system.	3.62	Agree
• t is not difficult to tell if this system has what I want.	3.44	Neutral
• sing this grading system for the first time is easy.	3.88	Agree
• sing this system is not wasting of time.	3.66	Agree
Total Average Mean	**3.66**	**Agree**

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

The criteria for evaluating the system based on user happiness are indicated in Table 4, with the greatest weighted mean of user satisfaction being 3.88 and the lowest being 2.98.

Table 4 System Evaluation Criteria for the User Satisfaction

User Satisfaction	**Mean**	**Description**
This system is very much interesting.	3.88	Agree
This system is very attractive.	3.66	Neutral
I feel in control when I'm using this system.	3.58	Neutral
I don't like using this system.	2.98	Neutral
Using this system is not wasting of time.	3.56	Neutral
This system has a favorable feature.	3.70	Agree
I get what I expect when I click on things system.	3.74	Agree
Everything on this system is easy to understand.	3.70	Agree
Total Average Mean	**3.60**	**Neutral**

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

Table 5 summarized the system's assessment. According to the Dependability of Information Use, reliability means that the system is always accessible and complete. According to the table, the greatest weighted mean of Reliability is 3.8, while the lowest is 3.78.

Table 5 System Evaluation Criteria for the Reliability

Reliability	**Mean**	**Description**
This system is very fast.	3.78	Agree
I get what I expect when I click on this system.	3.8	Neutral
Total Average Mean	**3.79**	**Agree**

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

Table 6 details the assessment criteria for the system based on the user's recall abilities. The table illustrates the extent to which the system aids the user in recalling its characteristics. In another sense, remember ability refers to the system's capacity to retain information about the user and hence speed the user's ability to execute tasks.

Table 6. System Evaluation Criteria for the Reliability Remember Ability

Remember Ability	**Mean**	**Description**
Remembering where I am on this system is very difficult.	3.64	Neutral
Total Average Mean	**3.64**	**Neutral**

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

The acceptability Website Analysis and Measurement Inventory Test (WAMMI) has a general weighted mean of 3.65, which is acceptable based on characteristics such as learnability, the efficiency of use, user happiness, dependability, and recall ability.

Table 7. General Weighted Mean for Acceptability of the E-Quarantine Pass with Contact Tracing

Description	**Mean**	**Description**
1. Learning Ability	3.54	Neutral
2. Efficiency of Use	3.66	Agree
3. User Satisfaction	3.6	Neutral
4. Reliability	3.79	Agree
5. Remember Ability	3.64	Neutral

Total Average Mean	**3.65**	**Neutral**

Legend: SA- Strongly Agree, A- Agree, N-Neutral, D- Disagree, SD- Strongly Disagree

CONCLUSION

The following conclusions were formed considering the findings:

1. The method was able to monitor individual cases of covid19 virus infection.
2. The suggested system model was efficient in terms of securing and maintaining vital information and enhancing the system's readiness.
3. The findings indicate that the system was evaluated and found to be beneficial for the respondents. The overall result is neutral, indicating that the system is very acceptable.

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