



**UNIVERSITY OF THE PHILIPPINES
OPEN UNIVERSITY**

Master of Information Systems

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**1KYUSI: A CENTRALIZED WEB-BASED INFORMATION MANAGEMENT
SYSTEM FOR THE LOCAL GOVERNMENT OF QUEZON CITY**

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MARTIN JOSEPH SIMBULAN

Student Name over Signature and Date

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This Special Project titled

1Kyusi: A centralized web-based information management system for the local government Of Quezon City is hereby accepted by the Faculty of Information and Communication Studies in partial fulfillment of the requirements for the Master of Information Systems.

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ABSTRACT

This paper aims to design and develop a centralized web-based management information system for efficient and accessible recordkeeping that will in turn, improve the delivery of basic social services by the local government units and their preparedness for disaster response.

1Kyusi will therefore serve as the data bank of every person residing in every barangay in Quezon City. The system aims to have an updated record of every individual but still adheres to Republic Act 10173 or the Data Privacy Act of 2012.

1Kyusi will greatly impact the project initiatives and disaster response of the Quezon City local government through its implementation at the barangay level under the management of the local government.

ACKNOWLEDGEMENT

I would like to thank my family, colleagues, and professor for their untiring support and our Almighty Father, for all the wisdom and strength to make this possible amidst the challenges the pandemic has brought us.

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Chapter I

THE PROBLEM DOMAIN

A. STATEMENT OF THE PROBLEM

The 1Kyusi project aims to address the problem of local governments in collecting data for recordkeeping and updating said data. As of this writing, most studies only address the information management system at the barangay level and hence there is no information management system and web-based portal yet at the city government and municipal levels.

For years, city governments and municipalities down to their barangays have not been able to establish a database that can be easily accessed, monitored, updated, and kept secure by the barangays under their jurisdiction. Hence, this translates to a problem in the implementation of city government policies pertaining to the efficient and prompt delivery of basic social services, and distribution of relief and cash aids to its constituents especially in times of calamities, and other emergencies as the case may be. At the moment, we can see this problem has been gravely highlighted by the pandemic which hit the whole world and our country, during the first quarter of 2020. The crippling effects of the coronavirus 2019 (COVID-19) has limited if not halted all physical interaction and movement bringing about disruption in economic activity as well as daily social activities causing difficulties in different areas of work and school. Government frontline activities have also been suspended resulting in further delays. Without any preparation for digitized operations and work-from-home setups, all public and private activities ceased to function. The national and local government was ill-prepared for a computerized or digital mode of operations in carrying out frontline services and delivery of cash aids or assistance.

B. BACKGROUND AND OBJECTIVES OF THE PROJECT

The existing data on the total Quezon City (QC) population is based on the national census conducted by the Philippine Statistics Authority (formerly known as National Statistics Office) every four to five years. This also includes demographics such as population by age, sex, major occupation, religion, marital status, and educational attainment. Despite the completeness of the national census done by the national government, its accuracy in relation to real-time data is not one hundred percent as many changes can happen within the span of four to five years. Consequently, local governments then would have to wait for a period of four to five years before updates can be made on the total population and demographics of its constituents.

Therefore, the objectives of 1Kyusi are the following: 1) to have an updated web-based management information system managed by the QC local government containing the population and demographics (sex, age, marital status, educational attainment, occupation, religion, and health condition or comorbidities) of Quezon City citizens; 2) to improve most of the manual transactions and recordkeeping practices down to the barangay level; 3) to track and analyze the movement of individuals to be used as a base data in information dissemination; 4) to enable city governments to efficiently formulate and implement programs and policies which cater to the specific needs of their constituents to the barangay level based on the data gathered from 1Kyusi.

C. SIGNIFICANCE AND SCOPE OF THE PROJECT

The 1Kyusi Project has been proposed just in time ahead of the lockdown, around the first week of March 2020. Interestingly, the author of the 1Kyusi Project saw it already as an urgent need to develop the said web-based information system even before the pandemic hit since many services and transactions had already gone online for convenience, accessibility, and digital recordkeeping. The author had intended for the project to be used as an innovative means of recordkeeping and the pandemic had only served to highlight the need for detailed web-based information systems such as 1Kyusi which can be used to monitor and assess the needs of the constituents of local government units such as Quezon City.

As earlier mentioned, we can see how the pandemic COVID-19 has exposed the gaps and failures of the current recordkeeping system of the local governments. From the city government down to the barangay level, there has been confusion due to the lack of data available. For instance, the distribution of relief goods has proven difficult as well as the implementation of the national and local governments' social amelioration programs. There has been an uproar in social media where citizens of said local governments are complaining of the slow delivery of the local governments' relief and cash aid during this pandemic. On the other hand, the city government and the barangay units had said that it still had to evaluate the social and economic status and profile its citizens before it could actually distribute the relief goods and cash aid. Such a process of going house-to-house and listing down the profiles of its citizens mean taking more time which we have no luxury of and further slowing down the delivery of much-needed relief goods and cash aids.

Due to the vastness of the target population, the project will be limiting its study to the city government of Quezon City and will be further narrowing it to the following barangays: Gulod and Bagbag. The author proposed the 1Kyusi Project to the Quezon City local government (QC LGU) last July 2020. The QC LGU expressed their interest in the said

project proposal but unfortunately, they had declined to participate since it may conflict with their planned project which is the QCitizen ID—that was only launched this January 2021.

Despite the QC LGU not having committed themselves to the project, they still expressed that they would wait for the prototype of the 1Kyusi Project when it is already available since the QCitizen ID and the 1Kyusi Project has notable differences as summarized in the table below:

QCitizen ID	1Kyusi Project
Applications for the QCitizen ID have to be done by the people through their own means (online and paper) which is prone to human errors.	The barangay’s designated Data Privacy Officer (DPO) will assign other barangay officials to conduct the house-to-house census and collect the information from their constituents. The barangay DPO will then input the gathered information to the 1Kyusi database which will then automatically form part of the QC LGUs active database for its citizens. The QC Local government shall also have its own DPO who shall maintain and monitor the 1Kyusi system at the LGU level.
Only encouraged and not mandated by law.	The project is to be mandated by the Quezon City local government.
Application can be done by basically any one—even those who are not genuinely residents of Quezon City by submitting fake documents or proof of residence in Quezon City.	Legitimacy of information and application can be done automatically or on sight since the information is gathered by the designated barangay officials going house-to-house which will thereafter be inputted.

D. DOCUMENTATION OF EXISTENCE AND SERIOUSNESS OF THE PROBLEM

As of writing, the author has been informed that the QC local government has not yet launched its planned QCitizen ID system. Hence, the author concluded based on the existing conditions that the status of recordkeeping in the QC local government is at best, still not automated and that the demographical information available is still also heavily based on the Philippine Statistic Authority national census conducted every four years. Data on the

constituents which is not regularly updated and easily accessible by the concerned officials such as the barangay is not reliable especially for disaster response and project planning. Also partially discussed earlier, this recurring problem of data not being regularly updated was highlighted during the early days of the COVID-19 pandemic where the local government immediately conducted data gathering to know the number of residents in each barangay to properly distribute relief goods and the cash aid under the Social Amelioration Program (SAP) of the Department of Social Welfare and Development (DSWD). During these days, almost every city in the country suffered delayed response and distribution of relief goods and many families were gravely affected due to the unpreparedness of the barangays and the local governments regarding their data on their residents. In Quezon City itself, many riots and coordinated movements were conducted by several groups condemning the slow and inefficient response by the QC local government since they had no data on hand and hence, did not know how to go about in distributing relief in an efficient and safe manner to the people in the barangays.

CHAPTER II

REVIEW OF EXISTING ALTERNATIVES

To date, there are only a handful of local governments which have started to digitalize their database of records – and many if not most local governments have only begun to realize the need and convenience of a web-based management information system due to the physical and logistical limitations imposed by the lockdowns due to the pandemic. Most local governments up until the author have already conceptualized this project, only utilized a manual mode of collecting data from its constituents to address the lack of a centralized web-based information management system. City governments and/or municipalities obtain their citizens' data by going house-to-house and handing out forms that ask details such as their name, age, sex, birth date, address, occupation, and educational attainment—with no guarantee as to whether these data collected are inputted in an accessible and secure database or end up papers being thrown away after every transaction. These details are often repeatedly asked in each transaction an individual makes despite having already submitted such details in a previous or different transaction with the city government and barangay.

Many city governments and barangays continue to resort to manually recording these details either through the use of programs such as Microsoft Word and Excel. Unfortunately, despite inputting such details, to reiterate there is no unified database between and among their respective barangays which can easily solve record management, updating, and access to information that can expedite the city government's programs.

It is no surprise, therefore, that many citizens have aired out their complaints on transacting with their city governments and barangays in order to avail of social services including processing of barangay clearances, certifications, cedula, and permits, identification card applications for senior citizens, PWDs, and solo parents and so on.

With this in mind, the best available resource for this project would be the existing manual records the city government and barangays have. This project aims to streamline the process of gathering each individual's information subject to Republic Act 10173 otherwise known as the Data Privacy Act of 2012. Similar to the national government's plan to have a Philippine Identification System, this project aims to create a web-based central identification system for all residents of a city, in this case Quezon City using the said existing records of the city government and barangay. By merging and corroborating the existing official records Quezon City's local government and its barangays, the project can demonstrate how developing a web-based management information system of the local government of Quezon City can provide a much more efficient option to easily record, capture, monitor, update, access and retrieve its residents' information including their transactions with the barangay and city government.

CHAPTER III

APPROACH TO BE TAKEN IN THIS SUBJECT

A. THEORETICAL FRAMEWORK

The study employs the Adaptive Structuration Theory (AST) by DeSanctis and Poole which is based on British sociologist, Anthony Giddens' Structuration Theory in relation to the Information Systems field.

B. RATIONALE FOR FRAMEWORK

The framework that best suits "1KYUSI" is the Adaptive Structuration Theory (AST) since the "AST criticizes the technocentric view of technology use and emphasizes the social aspects. Groups and organizations using information technology for their work dynamically create perceptions about the role and utility of the technology, and how it can be applied to their activities. These perceptions can vary widely across groups. These perceptions influence the way how technology is used and hence mediate its impact on group outcomes." [2]

"1Kyusi: A Web-Based Management Information System of the Local Government of Quezon City" will serve as the main Information System (IS) of the Quezon City government. This will be deployed in its different barangays to be able to identify the exact needs of a certain barangay.

Social groupings or populations grouped according to demographics such as age, sex, occupation, educational attainment, existing health conditions or disabilities and marital status will be the main target of the said IS to be able to effectively allocate the LGU's budget to more meaningful projects that a certain population group need. The IS will also be useful in case of emergencies or calamities as the Quezon City government can easily access the information of every barangay and efficiently disseminate the needs of the target population group. For instance, due to the COVID-19 pandemic that has hit our country, the DSWD-SAP had only just started to gather data manually by means of house-to-house checking and

filling up of forms to determine who are to receive the SAP during the pandemic. In effect, the people did not receive the amelioration on time. Whereas if “1KYUSI” will be deployed, it will lessen or rather eliminate these kinds of problems since everyone’s data will be easily available and accessible. 1KYUSI will be the most effective IS tool analytics to enhance the services of the LGU of Quezon City to the people.

C. TECHNOLOGIES TO BE CONSIDERED OR USED

The study uses a laptop or desktop computer, internet connection, and a cloud database. After the assigned barangay official gathers the data needed, he/she will need to use a laptop or desktop computer in order to enter the data collected into the 1Kyusi system. Upon logging onto their secured account, they may enter, update and correct the data upon review, request, and as needed. The Data Privacy Officer at the QC local government shall also use the same technology (laptop or desktop) in carrying out his/her tasks in monitoring and updating the 1Kyusi system.

Data warehouse modeling technique is followed as this will be the core of the system in generating analytics of all the data gathered/encoded in the system. This will also be effective once the web app starts adding additional functions or services that can be provided to its constituents.

The system also employs a predictive analytics technique by continuous learning, analyzing complex data, and machine learning. This enables the web app to provide advanced analytics or predictions based on the available data; this would further help the LGU in predicting the needs of its constituents. Also, adding the QR based tracking system will also help the QC LGU in information dissemination as it will provide concrete data on the mobility and concentration of people at any given time

D. METHODOLOGIES USED

The proponent follows the System Analysis and Design (SAD) methodology and handles front-end design, database design, form design, and validations of the 1KYUSI system. Also, the proponent hired a programmer to act as a support in preparing the advanced analytics that will include the predictive analytics of the system.

E. SYSTEM FEATURES AND STATUS

Feature	Description	Status (Percentage)
Log in Page	A landing page where the user should input their credentials	100%
Adding of Constituents	This is where the user will add the information of each constituent. This feature is the foundation of the system as this is where the analytics will come.	100%
Creation of User account	This feature will be used by the administrator for creating an account and designation of roles.	100%
Movement Tracker	The feature is another part of the analytics and is made to track the movement of each constituent by scanning their QR codes when entering establishments. This feature will help in contact tracing and information dissemination of the QC LGU as they will have the data on the flow of people.	100%
Creation of QR Scanner account	This feature will be used in creating an account that can scan the QR of the constituents. This account will be used by the establishments and will be	100%

	provided by the Brgy. DPO.	
Analytics	This feature serves a big part in the system as this will provide the analytics that will be used in the effective deployment of services and projects provided by the QC LGU.	100%
Predictive Analytics	This feature will be another part of the analytics as through machine learning the system will be able to predict necessary information that would again be helpful in the effective deployment of services and projects provided by the QC LGU.	100%

CHAPTER IV

PROJECT PLAN

A. CONCEPT

Description:

1Kyusi is a cloud-based application following the Software as a Service (SaaS) which will serve as a data bank for the Local government of Quezon City. The application have 4 account types. The system administrator/support account, administrator/supervisor account, the user account, and the scanner account.

The application will be administered by the Quezon City government-assigned Data Privacy Officer (DPO). The QC DPO will be the system administrator/support account and will be able to generate reports and analytics of all or specific barangays. The application will also be deployed in various barangays under the Quezon City government and there will be another Data Privacy Officer (BRGY DPO) who will be the administrator at the barangay level, the said officer will be able to generate reports and analytics of their barangay. User accounts will be given by the DPO of the barangay thru the trust and confidence selection process the said account will be able to add, edit and update the information of its stakeholders. The scanner account will be given by the BGRY DPO to business establishments under their jurisdiction and will serve as a QR movement tracker.

Key Features:

Predictive Analytics – the web app can perform predictions in the future through machine learning.

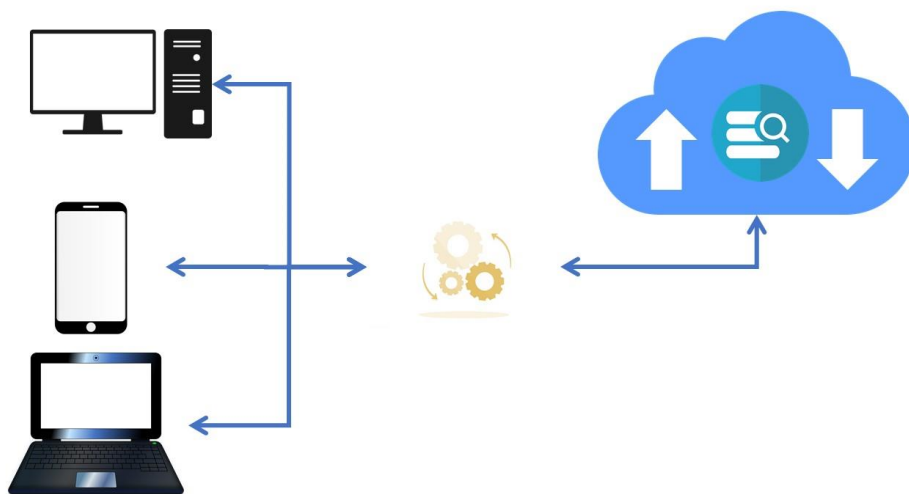
Accessibility – the web app can be accessed by any device that has an internet browser and internet.

Reliability – the data is always up to date as the data gathering/updating will be done every 6 months.

Security – there is a lot of cloud-storage vendors who offers market standard security e.g., GCP, AWS, and so on.

Scalability – The system can add features as needed.

System Architecture



B. METHODS

Methods used in data gathering for this project are:

Interviews - Interviews with the LGU officials and concerned departments for the project proposal.

Surveys - acceptance of the public in sharing their information to the barangay.

Brainstorming and FGD - both for LGU officials and the Public.

Information Drive – to encourage the public and remove speculations and worries in sharing their information with the barangay.

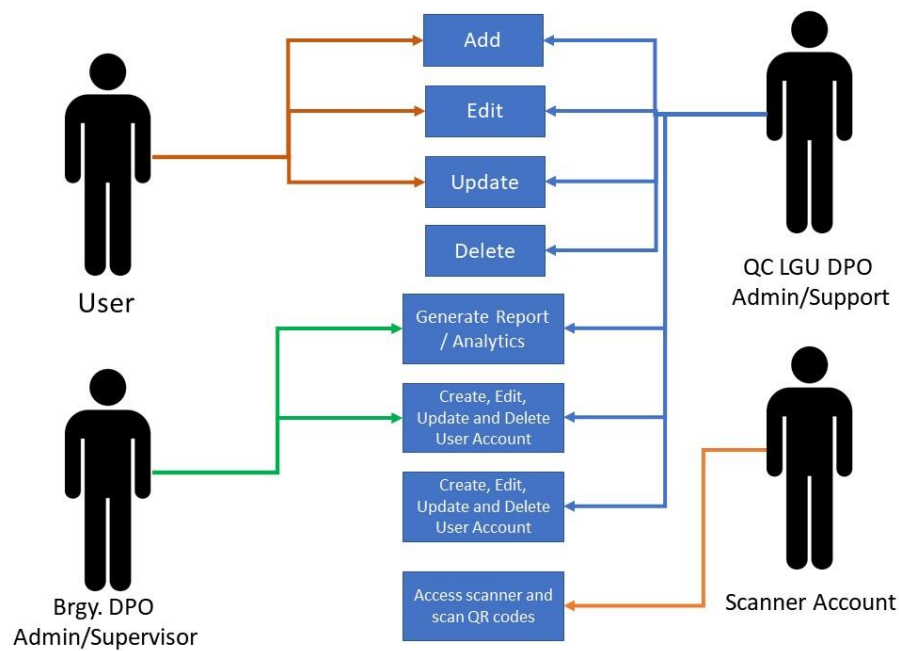
C. USER ACCEPTANCE TESTING AND PROJECT ASSESSMENT

System Development Timeline

TASK	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Planning	█	█	█	█								
Analysis			█	█								
Designing				█	█	█						
Development						█	█	█	█			
Testing							█	█	█	█		
Deployment											█	█

As shown in the Gantt chart Planning, Development and Testing take up more time but aside from Planning, the Testing phase will be the most critical part of the system since the system will hold the information of each and every constituent of Quezon City, VAPT, or Vulnerability Assessment and Penetration Testing will be done several times to ensure the security in the data in the system. Given that the system will follow the SaaS method and be handled by reputable cloud solution providers in the market it is still necessary to conduct VAPT to ensure the people that their information is well kept and protected.

User tests were conducted based on the Use case model illustrated

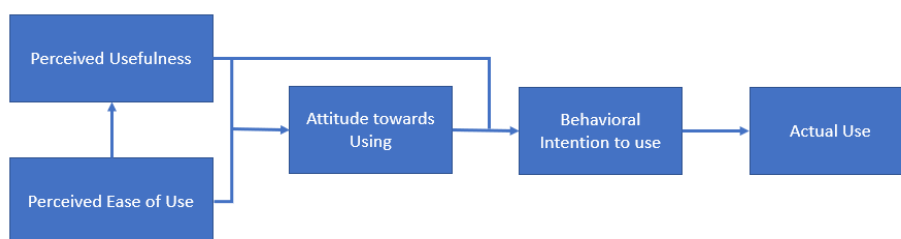


Project Assessment and status

Project Plan	Status
Review project requirements	Done (100%)
Project Planning	Done (100%)
Data Gathering	Done (100%)
Finish Deliverables (i.e, design and development)	Done (100%)
User Acceptance Testing	Done (10 respondents)
Implement and Publish the Web App	Not yet deployed

USER ACCEPTANCE TESTING RESULT (UAT)

1KYUSI UAT survey followed the Technology Acceptance Model (TAM) as prescribed by the adviser. TAM proposes that if a user finds the technology easy to use then the technology is identified useful. Based on the results the technology was identified as useful, and the participants shows a positive attitude towards using the technology.

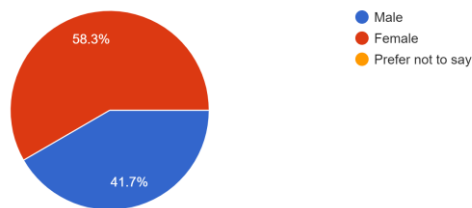


Participants and Procedure

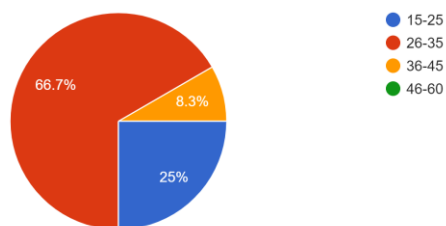
UAT survey is deployed using Google forms and the link was sent to participants. Instruction, link to the system, username, password, brief overview of the project, Demo video on how to use the system, and other necessary information was indicated upon opening the google form before proceeding to the UAT survey questions (you may see the form [here](#)). Each individual is strategically chosen as they represent different demographics such as profession, gender, age group, and experience and familiarity in using technology (computer software).

Demographics

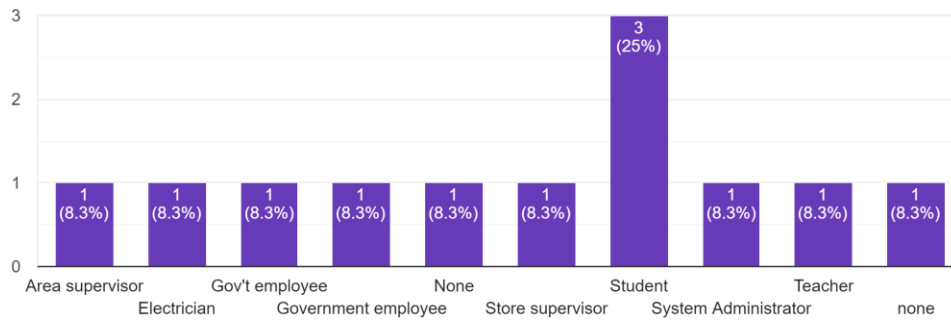
Gender
12 responses



Age Bracket
12 responses



Profession
12 responses



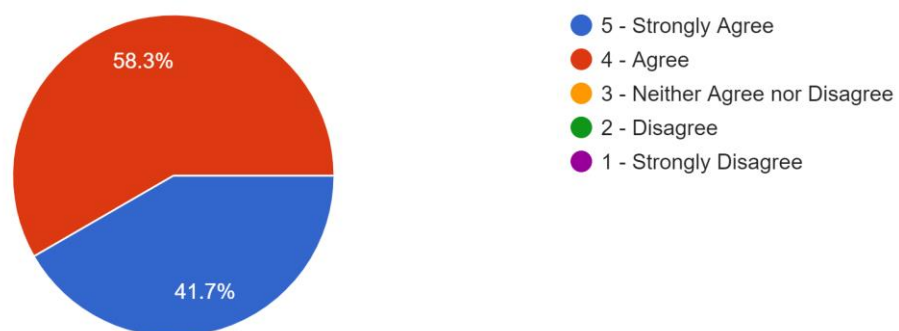
Findings

A factor analysis of usefulness and ease of use showed as the participants' answers agree and strongly agree based on the survey. There was no significant concern or problem between different demographics and the system still shows its usefulness or ease of use. Comfort level, however, demonstrated a negative association with the design especially in the movement tracker feature of the system. The participants identified themselves to have confusion in understanding the movement tracker feature, thus proposing an alternative solution. Despite the confusion experienced by the participants they still find the system effective and easy to use. Comments and suggestions were also taken into account and were used to improve the system.

1KYUSI UAT testers summary of responses

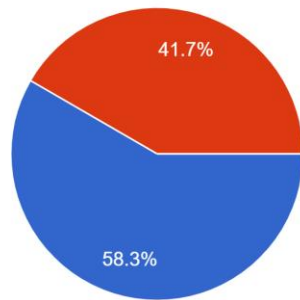
I find the system easy to navigate.

12 responses



Learning to operate 1KYUSI was easy for me.

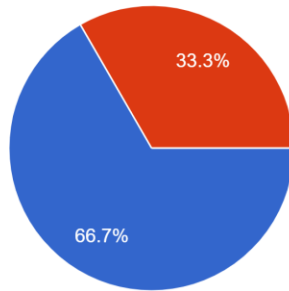
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

It is easy to remember on how to use the 1KYUSI.

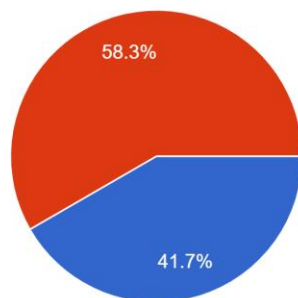
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

It is easy to understand the analytics.

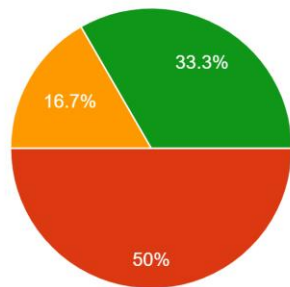
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

It is confusing using the movement tracker.

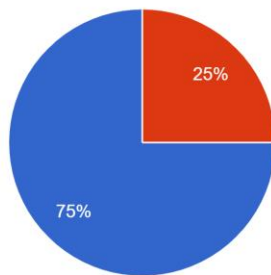
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

1KYUSI is straightforward in providing needed information.

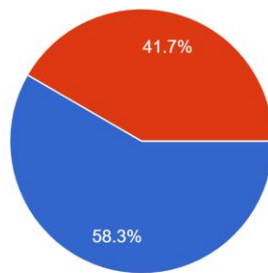
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

My interaction with 1KYUSI is clear and understandable.

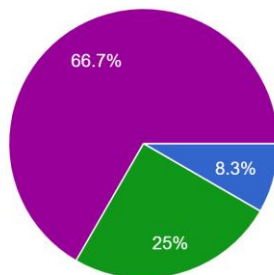
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

I feel that it takes a lot of effort to become familiar in using 1KYUSI.

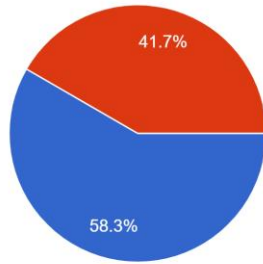
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

Overall, I feel that 1KYUSI is easy to use.

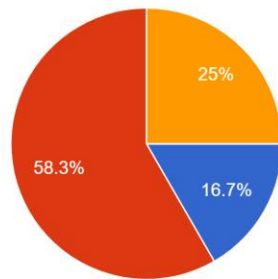
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

1KYUSI can greatly enhance the services provided by the government.

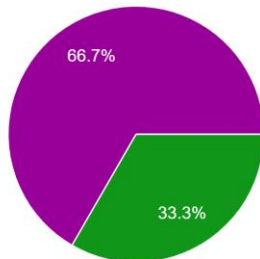
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

I find 1KYUSI cumbersome to use.

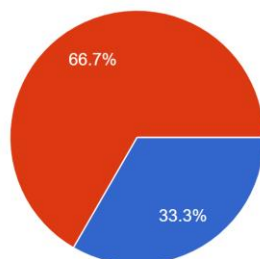
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

Even without a manual 1KYUSI is easy to understand.

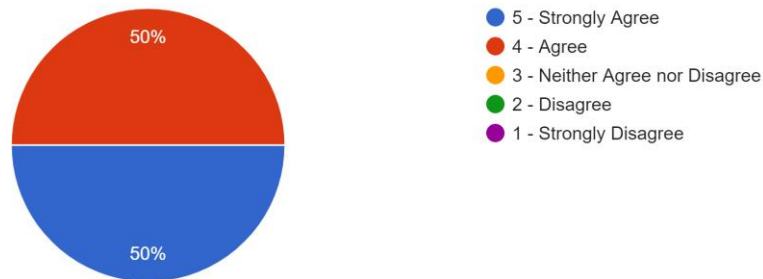
12 responses



- 5 - Strongly Agree
- 4 - Agree
- 3 - Neither Agree nor Disagree
- 2 - Disagree
- 1 - Strongly Disagree

Overall, I find 1KYUSI useful in data generation and analytics.

12 responses



Other suggestions/comments for the improvement of the system

- system can be abused but it is a good system - a little bit enhancement specially in adding more fields and important valuable data. The system is promising if used rightfully
- I like it
- none
- Please improve the the movements tracker. I don't know if it is a design issue. It is a bit confusing.
- it is easy to navigate, you may try to create a graph or chart for the movement tracker for easy understanding like the analytics
- no suggestions/comments
- Improve design
- this can be used in corruption specially in the upcoming election
- Improve movement tracker
- Tracker is hard to read
- the system is usable and user friendly
- it crashes and I have to type again the details of the person

CHAPTER V

RESULTS AND DISCUSSIONS

The result of the UAT survey is promising and shows the usefulness and ease of use of the system. The respondents, given that they belong to different demographics and experience levels and familiarity with technology was still able to understand the system and saw its effectiveness in delivering its purpose. Hence the 1KYUSI can be considered a successful and effective system that would help the QC LGU in delivering its service to its constituents.

CHAPTER VI

CONCLUSIONS

The system shows a promising output therefore the proponents conclude that the system will be a great asset for the QC LGU and will serve its purpose.

It will greatly impact the services provided by QC LGU to its constituents.

CHAPTER VII

RECOMMENDATION

The 1KYUSI information management system is intended for the Quezon City Local Government Unit. The proponents were able to address the need for a proper database of its constituents for a better response and delivery of service. For future researchers, we suggest following the bureaucracy of the organization for a better gathering and support from the organization.

*The system can also be implemented in different LGU.

*Future developers can also add features/services from the Brgy. level (summons, Brgy. clearance, etc.)

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