

## Regional Government Center - Information Kiosk (RGC Ikiosk)

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Master of Science in Information Technology

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### Dedication

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The study provided a design and evaluation of the RGC iKiosk, an interactive information system aimed at improving service delivery in the Regional Government Center. The project began as a response to ongoing visitor issues related to travel directions, inconsistent access to government forms, and the need for manual inquiries and printed signages. The iKiosk was implemented

to solve these problems by providing one digital space with an agency directory, announcements, downloadable forms to use, and a means of transport request through e-Trike services.

The study determined that the iKiosk fostered more efficient government service delivery access, and conveyed how public transactions could be simplified using digital means, mitigating some of the physical bottleneck movements of service delivery, and establishing a more inclusive and service-oriented approach to governance. The study promoted the practical ICT solutions that can be implemented in a scalable manner to solve everyday problems in public institutions.

**Keywords:** iKiosk, Information Kiosk, Information System, Government Kiosk, and Kiosk

## Introduction

### Background of the Study

Information Technology made a remarkable impact on the fast-paced and ever- changing lifestyle of modern times. The great innovations it brought were widely embraced and celebrated. The world experienced rapid societal changes and a fast way of life, fueled by continuous discoveries and the widespread use of computers, laptops, tablets, and mobile phones, which provided access to information anytime and anywhere. The technology used during that time transformed many aspects of life, making people more satisfied with their work. This served as clear evidence of technological advancement that accelerated changes within the generation. It was all made possible through the technology of that era.

As the Regional Government Center (RGC) located in Tuguegarao City grew in size and complexity, it became increasingly challenging for stakeholders to navigate the various regional government offices. A frequent dilemma for many people encountered was navigating the RGC. The problem was partially alleviated through the establishment of information kiosks that provided locator maps.

The researcher, faced with the daily navigational burdens of the Government Center's stakeholders, sought to create an original navigational systems development project that would eliminate the dependency on "getting lost" when visiting an intended destination at a government office. This project was called the Regional Government Center Information Kiosk, or RGC iKiosk.

The RGC iKiosk is an information portal that was installed at the five major entrances to the Regional Government Center. Its integration implements automations ensuring visitors were welcomed, had lodestone, navigational instant information sharing, and even a transportation request capability within the center.

This original development also set the stage for thinking broader, with concepts such as Smart Cities, what future implementations could devices or kiosks evolve to, for example: ATM integration; private partners associated with and offering health insurance, property insurance; health care access through telemedicine; disseminating information from many sources; and economic increasing empowering stakeholders.

Moreover, the RGC iKiosk aligned with the United Nations Sustainable Development Goal (SDG) Number 9, which focused on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation. It also supported SDG Goal Number 11, which aspired to make cities and human settlements inclusive, safe, resilient, and sustainable. Through this project, the vision outlined in *AmBisyon Natin 2040* was echoed wherein by the year 2040, the Philippines aimed to achieve a Matatag, Maginhawa, at Panatag na Buhay para sa Lahat.

### Statement of the Problem

Determine the current practices, policies, problems, and issues encountered in the current system.

Design and develop an integrated an integrated information system to address the problems and issues found in the current system.

3. Determine the extent of compliance of the developed system using the ISO25010:2011 assessment standard in terms of:

- 3.1. functional suitability;
- 3.2. performance stability;
- 3.3. compatibility;
- 3.4. usability;
- 3.5. reliability;
- 3.6. security;
- 3.7. maintainability; and
- 3.8. portability

4. Determine the usability and acceptability of the developed system using the UTUAT2 assessment standard in terms of

- 4.1. systems performance;
- 4.2. effort expectancy;
- 4.3. social influence;
- 4.4. facilitations; and
- 4.5. hedonic motivation

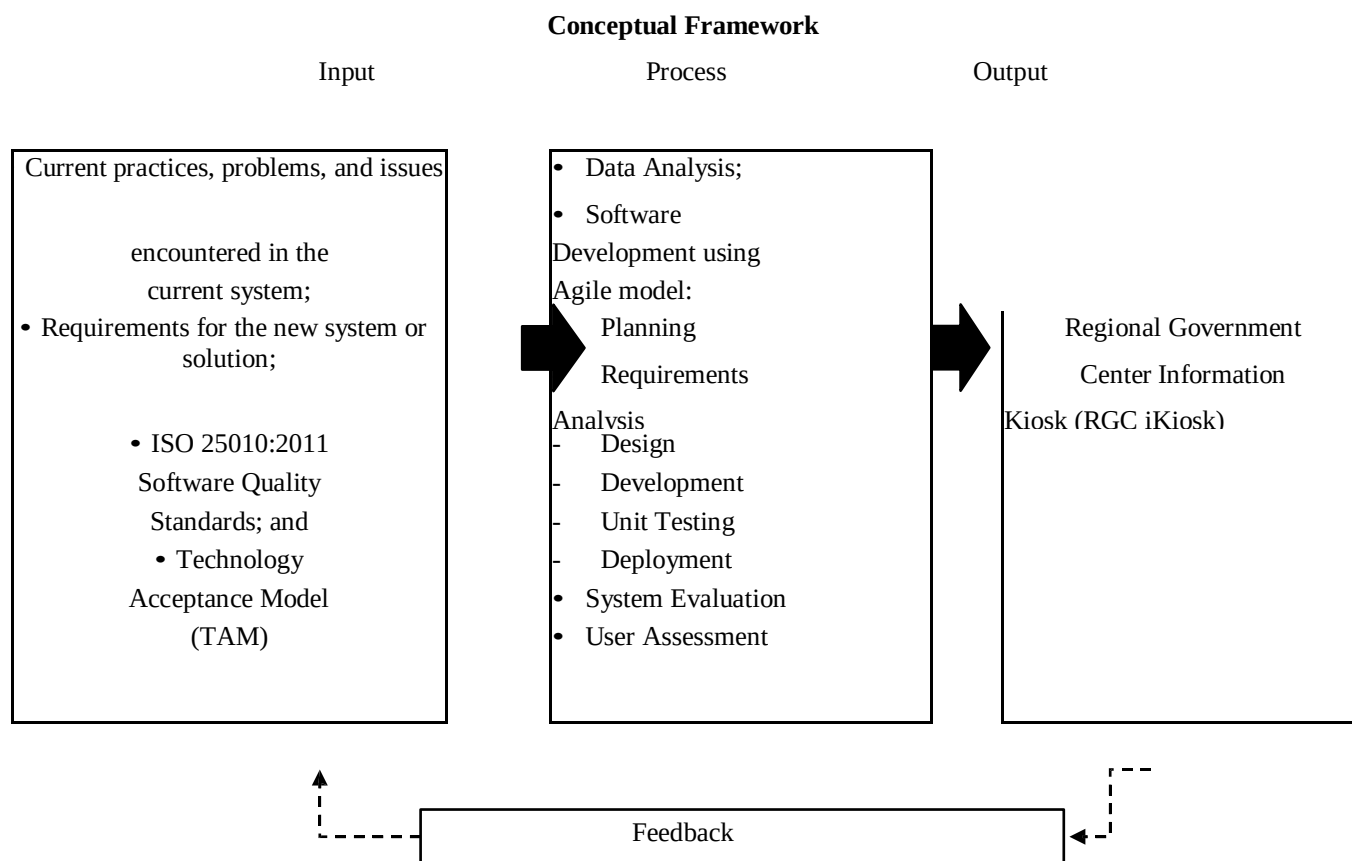


Figure 1. Conceptual Framework of the Proposed Project

As shown in Figure 1, is an organized concept that are broadly defined and systematically arranged called Input-Process-Output Model. It will be utilized in the development and evaluation of the RGC iKiosk.

### Significance of the Study

This study is mainly for the **Stakeholders** of the RGC most likely the grassroots level with limited capacity to have their own Global Positioning System (GPS)- enabled equipment and internet connection; Various **Regional Line Agencies (RLAs)**, to increase their stakeholder engagement by posting their current job vacancies, procurement opportunities, forms, and other promotional materials; The **Department of Science and Technology (DOST)** which welcomes Smart City Technology-innovations and later-on the host of the proposed system; and For the future **Researchers and developers**, may they find this study useful as a reference to do some further along this area.

### Scope and Delimitations

The scope of the project encompassed the development and implementation of an innovative information kiosk within the Cagayan Valley Regional Government Center. The project focused on:

**Map Navigation** – The inclusion of map navigation as a main feature provided users with an intuitive navigation experience within the regional government center complex, enhancing accessibility and user experience;

**Streamlining Government Services** – The iKiosk served as a centralized hub for announcements, promotional materials, job vacancies, procurement opportunities, site navigation, and access to forms, directories, and custom maps; and

**Ride-Hailing Technology** – In partnership with CSU–Carig Campus, the system was equipped with a feature that allowed stakeholders to request rides quickly.

While the project aimed to bring about positive changes, certain limitations were recognized:

**Specific Regional Context** – The project focused on the development and implementation of the RGC iKiosk within the context of a specific regional government center. The findings might not have been directly applicable to other regional centers with distinct characteristics;

**User Adoption and Acceptance** – The success of the project depended on user adoption and acceptance. Resistance to technological change or unfamiliarity with the kiosk interface could have influenced user engagement;

**Dynamic Government Policies** – The iKiosk operated within the framework of existing government policies. Changes in policies and procedures after implementation might have affected the relevance and effectiveness of the RGC iKiosk;

**Limited Assessment Period** – The iKiosk had a limited assessment period, and its long-term impact and sustainability might have required further observation beyond the scope of the study;

**Data Security Considerations** – The iKiosk handled sensitive information, and although security measures were implemented, potential data security risks could not be entirely eliminated; and

**Resource Constraints** – The availability of resources, including funding, manpower, and technological infrastructure, may have impacted the extent and sophistication of the features incorporated into the iKiosk

### **Review of Related Literature and Studies**

This section presents the related studies and related literature on the system. The researcher herein presents the facts and information gathered from the different resources.

An interactive kiosk is a computer terminal featuring specialized hardware and software designed within the public exhibit that provides access to information and application for communication, commerce, entertainment, and education.

Early interactive kiosk sometimes resembled telephone booths, but can also be used while seating on a bench or chair. Interactive kiosk is typically placed in high for traffic setting such as hotel lobbies or airports.

Integration of technology allows kiosk to perform a wide range of function, evolving into self-service kiosk. For example, kiosk may enable users to enter a public utility bill account number in order to perform an online transaction, or collect cash in exchange for merchandise. Customize components such as coin hoppers, bill acceptors, card readers and thermal printers enable kiosk to meet the owner's specialized needs.

The global adoption of digital kiosks has been transformative across various sectors, enhancing service delivery, user experience, and operational efficiency. In the retail industry, self-service kiosks have become increasingly prevalent. A study by Rastegar et al. (2021) examined factors influencing customers' decisions to use self-service kiosks in quick-service restaurants, highlighting the importance of trust, self-efficacy, perceived ease of use, and perceived usefulness in driving adoption.

The transportation industry has adopted self-service kiosks, which have been integrated into the passenger processing experience at airports around the world. One of the developments in self-service kiosks involves Common Use Self-Service (CUSS), where multiple airlines share check-in kiosks. This type of kiosks are more efficient for airlines and as a result, they are more economical for passengers. Wilkerson, Zhang, Cinnamond, Faulkner, & Zubizarreta (2020), completed a study on passenger use of self-service kiosks and reported that perceived usefulness and perceived ease of use of self-service kiosks were the most important factors influencing passengers intention to use self-service kiosks. Kiosks in healthcare facilities have been used to improve the patient experience. For example, the Veterans Administration in the United States has deployed over 5,000 patient kiosks that assist patients with check-in and appointment management, and efficiencies in operations and patient satisfaction have been reported (Gonzalez, 2019). The design of kiosks and their usability is paramount. Lee (2018) explained how designing and developing user experience (UX) factors of public kiosks is significant, and concluded that designs need to allow users through the interface(s) without barriers, intuitively, and promote user satisfaction. A study on the Istanbul Public Transportation System was employed to examine the design of kiosks and how user centered design ideas can produce effective interfaces (Kaniou, Vasalou, O'Dair, & Michailidis, 2019). Considerations for accessibility and inclusivity needs to be a planned aspect of deploying kiosks. UserWay (2023) explored the widely used and acknowledged need for digital kiosks to be usable for users with disabilities (including characteristics such as height) in designing and deploying kiosks. Examples of thought processes required are incorporating audio, tactile button, height adjustability features, and more. The self-service kiosk market is a global highlight of a shift toward growth in self-service technologies. In a market report published, by Grand View Research (2025), the global market was valued in 2024 at USD 34.36 billion. The market is projected to grow at a compound annual growth rate of 10.9%, from 2025-2030, and is being driven by satisfactory contactless service solutions in various industries.

The use of Digital Kiosks in the Philippines brought huge convenience as a response to the peaking demand for contactless, efficient, and user-friendly service delivery especially during the COVID-19 pandemic. Studies explored the application of kiosks

in different sectors such as communication, information dissemination, education and food service to government operations, providing relevant insights that inform the conceptualization and development of Project iKiosk.

In the food-related industries, a study conducted by Bacani last 2023 in Santa Cruz, Laguna, explained that the relationship between user experience factors such as convenience, menu design, order accuracy, and ordering speed and customer satisfaction in self-service kiosks. Results revealed that it significantly influenced overall satisfaction, underscoring the importance of intuitive interface design to encourage customer adoption according to the study of Bacani (2023). Similarly, research in Nueva Ecija emphasized that human-computer interaction, particularly the simplicity and responsiveness of the user interface (UI), plays a vital role in enhancing customer satisfaction and increasing the likelihood of repeat kiosk usage by Garcia & Dela Cruz, (2023).

Meanwhile, a broader evaluation of self-ordering kiosk systems in Metro Manila—specifically in Quezon, Valenzuela, and Caloocan—showed that both customers and staff viewed kiosks positively due to improvements in order accuracy and service convenience. However, common challenges included unstable internet connections and limited payment integration, pointing to the need for technical upgrades and better infrastructure support (Rodriguez & Santos, 2023).

Kiosks have shown great potential in academic environments as well. At the Central Philippines State University, playing in a kiosk project that included an interactive information kiosk with a 3D map functionality to help users navigate the campus was a valuable project. This intended use of these kiosks enhanced accessibility and usability for users especially for first-time visitors and students who were unfamiliar with the area of the university (Reyes et al., 2022). At ABE International Business College in Manila, the proposed information kiosk system was part of their college to address a deficiency in directional signage way finding for prospective students. The kiosk informed users through an interactive campus map, while ensuring the design was inclusive of users with various degrees of digital literacy (Lopez & Mendoza, 2021).

At the government level, the Bureau of Internal Revenue (BIR) started deploying digital kiosks for tax filing, and other revenue collection purposes. This initiative aims to support the government's goal of digital transformation while improving efficiency and service delivery in public service (BIR, 2024). Another initiative is with the Department of Science and Technology's (DOST) Science and Technology Academic and Research-Based Openly Operated Kiosk Station (STARBOOKS) that is providing a digital library kiosk that houses educational resources for remote schools and public libraries throughout the country (DOST- STARBOOKS, 2023).

## Research Design

The RGC iKiosk project adopted a descriptive, developmental design, which included the use of surveys and interviews to create an understanding of what users thought of their experience with the iKiosk. The researcher drew from normal users, government workers, and IT professionals in order to get a broader understanding of usage experiences. The surveys included questions about ease of use and satisfaction, while the interviews enabled the researcher to include greater detail based upon the users lived experience.

In technical terms the researcher employed the Plan-Driven Waterfall Methodology based on the standard System Development Life Cycle (SDLC) for guiding a software development process taken from the Plan-Driven Waterfall Model (SDLC: planning, systems analysis and requirements, systems design, development, integration and testing, implementation, operations and maintenance). By incorporating the foregoing methodologies, the researcher was able to draw a comprehensive picture of the way that the RGC iKiosk made a difference. The researcher was also mindful about ethics, where consent was gained from the participants as well as ensuring confidentiality.

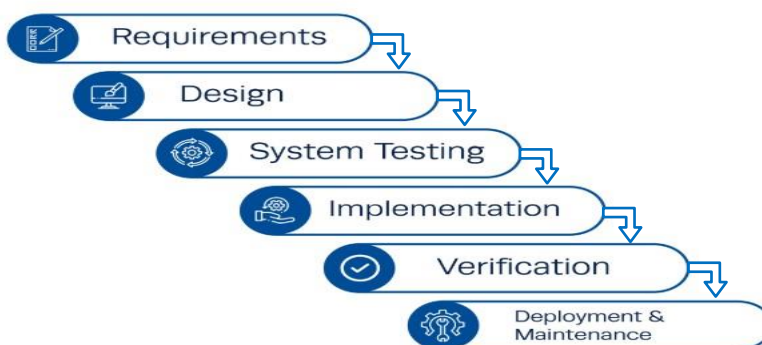


Figure 2. Waterfall Model

As depicted in Figure 2 above, our RGC iKiosk project followed the Waterfall Development Model to ensure a structured and clear development approach. In the Requirements Gathering and Analysis phase, we collected information from stakeholders to determine the needs of the new system, such as navigation of the map, generation of forms, and user situations. The System Design phase focused on designing the overall architecture and database as well as the user interface and APIs that might be needed, such as Google Maps or Petal Maps.

The Implementation phase involved building the system consistent with the plan, including functionality about navigation and the admin dashboard. We performed Testing afterward and validated the system with Unit Tests, Integration Tests, and User Acceptance Testing (UAT).

For the Deployment phase, we installed the system located at the entrance of the RGC while we set monitoring tools to measure performance. Finally, in the Maintenance and Updates phase we ensured the RGC iKiosk system was functioning and still relevant by completing regular updates and enhancements are made to the system based solely on users' feedback during runtime if/when there was a need.

By using the Waterfall Model, each phase was completed thoroughly before moving to the next, ensuring a well-developed, tested, and successful iKiosk system.

An evaluation tool was also given to the users to assess the system's functional Suitability, Reliability, Performance Efficiency, Usability, Security, Compatibility, Maintainability, and Portability as well as System Performance, Effort Expectancy, Social Influence, Facilitations, Hedonic Motivation. The evaluation tool used a Likert scale with values ranging from "Excellent" (Value = 5) to "Fair" (Value = 1). Testing was repeated to check for errors and bugs and to analyze the results of the evaluation tool. In the fifth step, the system was developed and tested, and both system analysts and end-users observed its efficiency and effectiveness. After completing the previous steps, the last step was the review phase. The results were reported, and feedback and recommendations were discussed for further improvements.

### Locale of the Study

The study was conducted at the main entry point of the Regional Government Center in Tuguegarao City. Choosing the study location was a team effort that involved working closely with government agencies, consulting with stakeholders, and considering practical factors such as accessibility, available resources, and the project timeline.

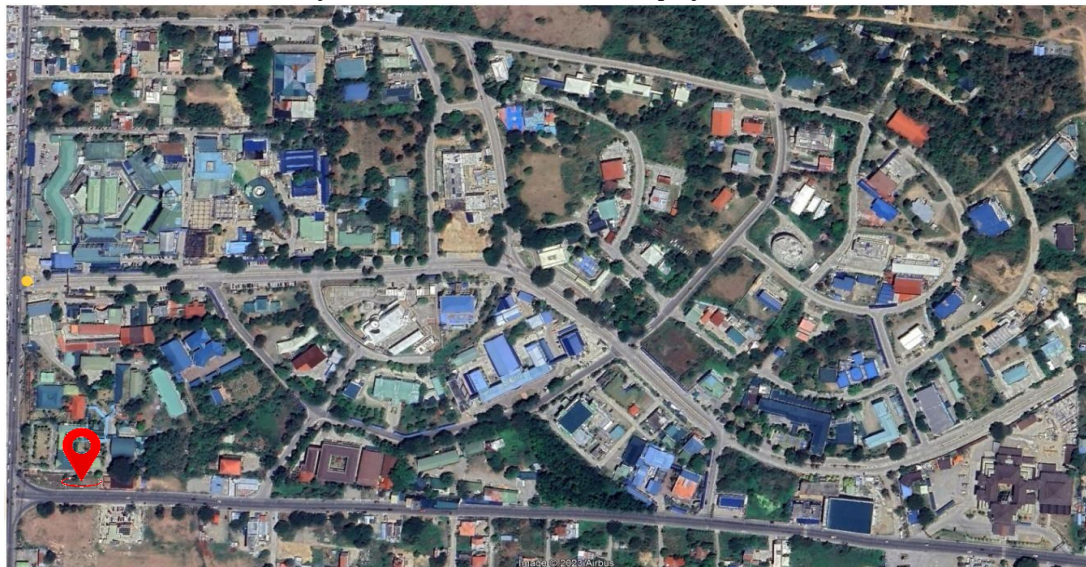


Figure 3. Map of Regional Government Center as of September 2024, Located in barangay Carig Sur in Tuguegarao City, Cagayan.

**Respondents and Sampling Techniques:** Given the nature of the project and the diversity of stakeholders involved, a purposive sampling method combined with a 5-point Likert scale was considered appropriate. This sampling technique involved selecting individuals who had direct engagement with or relevant expertise concerning the RGC iKiosk Project. The sample included a total of 100 stakeholders, composed of five government agencies, with each agency contributing 20 visitors selected based on frequent foot traffic and relevance to the project. Additionally, five government agencies were identified based on being the most commonly visited by random stakeholders. The sample also included ten Information Technology (IT) representatives who were responsible for overseeing government service centers or technology implementation; their role was essential in providing insights into user needs, administrative workflows, and potential system challenges. Furthermore, five drivers or CSU eTrike representatives were included, given their active role in the transport service component of the system. Lastly, two administrative-level users from the Department of Science and Technology Region 2 (DOST II) were involved to provide higher-

level feedback on system integration and policy alignment. The researcher ensured the appropriate execution of privacy procedures for respondents, given the confidential nature of the study's findings. Additionally, the researcher acquired and communicated consent from survey participants, outlining their understanding of the study and its objectives. The researcher informed the respondents that participation in the study was voluntary, with the option to withdraw at any point without obligation to provide a reason. This was communicated through a cover letter, an informed consent form, and a duly signed letter stating that the purpose of the study was strictly for academic purposes.

Table 1: Distribution of Respondents

| Respondents                       | Frequency (n) | Percentage (%) |
|-----------------------------------|---------------|----------------|
| RGC Visitors                      | 100           | 81.97          |
| IT Experts                        | 10            | 8.20           |
| Government Agency Representatives | 5             | 4.10           |
| CSU eTrike Driver                 | 5             | 4.10           |
| Admin User                        | 2             | 1.64           |
| Total                             | 122           | 100.00         |

The participants were taken through purposive sampling considering the following criteria:

**RGC Visitors:** Each visitor must visit at least one government agency, and researcher will pick the top 5 most visited agency with 20 visitors in each;

**IT Experts/ Representatives:** Professionals with a background in databases, programming, and web development;

**Government Agency Representative:** Must be an administrative staff who is in- charge of posting announcements such as job vacancies, procurement opportunities and other publications;

**CSU e-Trike Driver / Representative:** Must have an idea on the operationalization of the eTrike and the government center routes; and

**System Administrators:** Assurance that everything is updated from announcements, job listings, and agency info up to users always see the latest details. They also manage who gets access to what, especially for government agency reps using the platform. Handle backups, and pull-out reports to see how well the system is doing and where it can improve.

The study's conclusions were classified, and the researcher ensured that the respondents were properly anonymized. Following that, the researcher complied with the guidelines of the Data Privacy Act of 2012.

Additionally, the researcher sought and obtained informed consent from the survey respondents, confirming their awareness of the study's objectives. To produce valid and reliable results, sufficient representation of samples and the use of an appropriate sampling method were adopted.

### Research Instruments

The following tools were used and were helpful in acquiring the necessary data:

A. Survey-questionnaires. The primary data gathering tool was a survey- questionnaire.

A1. Standard Questionnaire for admin-level users and IT experts was used, comprising statements based on the criteria set by the ISO 25010 software quality standard to assess the system's functionality, reliability, portability, maintainability, usability, and security;

A2. Integrated UTUAT2 Questionnaire or the Unified Theory of Acceptance and Use of Technology developed by Venkatesh et al (2012) was utilized for CSU e-Trike drivers, government agency representatives, and RGC stakeholders or visitors; and

B. Interview Guide. Series of interviews was conducted with respondents to identify current problems and challenges, which served as the researcher's basis for system design.

C. Observation Checklist: The researcher had considered observing the processes involving the key offices which are part of the study.

### Data Gathering Procedures

The data collection process encompassed several sequential steps. First, the approval of the thesis proposal was sought through a formal letter addressed to the Secretariat of the RGC Management Committee which is DPWH2, DOST RO2 as the

host of the iKiosk system, DICT for the pool of IT Experts, CSU-Andrews and Carig Campuses for the e-Trike Drivers, and various Government Agency Representatives. This letter requested permission to conduct the study and provided a comprehensive overview of its objectives and scope. Upon receiving authorization, the researcher proceeded to develop the system, incorporating input from the respondents and enhancing the existing manual system by integrating the requested additional features. To conceptualize the modules to be implemented, a series of informal interviews were conducted.

Finally, upon completion of system development, the researcher evaluated and assessed the system by soliciting feedback from end-users and IT experts, in accordance with the ISO 25010:2011 Software Quality Evaluation Standards and UTAUT2 standards.

### Problem Identification and Motivation

Problem identification was the primary factor that the researcher initially used. To accomplish this, the researcher conducted a series of interviews with interested parties to diagnose the issues and requirements associated with navigating government agency offices of the RGC's stakeholders and other sub-features of the RGC iKiosk.

### Definition of the Objectives for a Solution

The researcher developed the study's purpose based on the challenges and needs after gaining a clear understanding of the problems, in order to support the features of the iKiosk system.

### Design and Development

Having established the objectives, the researcher scrutinized the requirements for the identified issues and the intended outcomes. Subsequently, the researcher proceeded to devise the layout of the intended user interface and system capabilities, encompassing the process of flowcharting. The design incorporated elements that entailed programming, coding, and initial testing in preparation for deployment.

### System Architecture using Data Flow Diagram

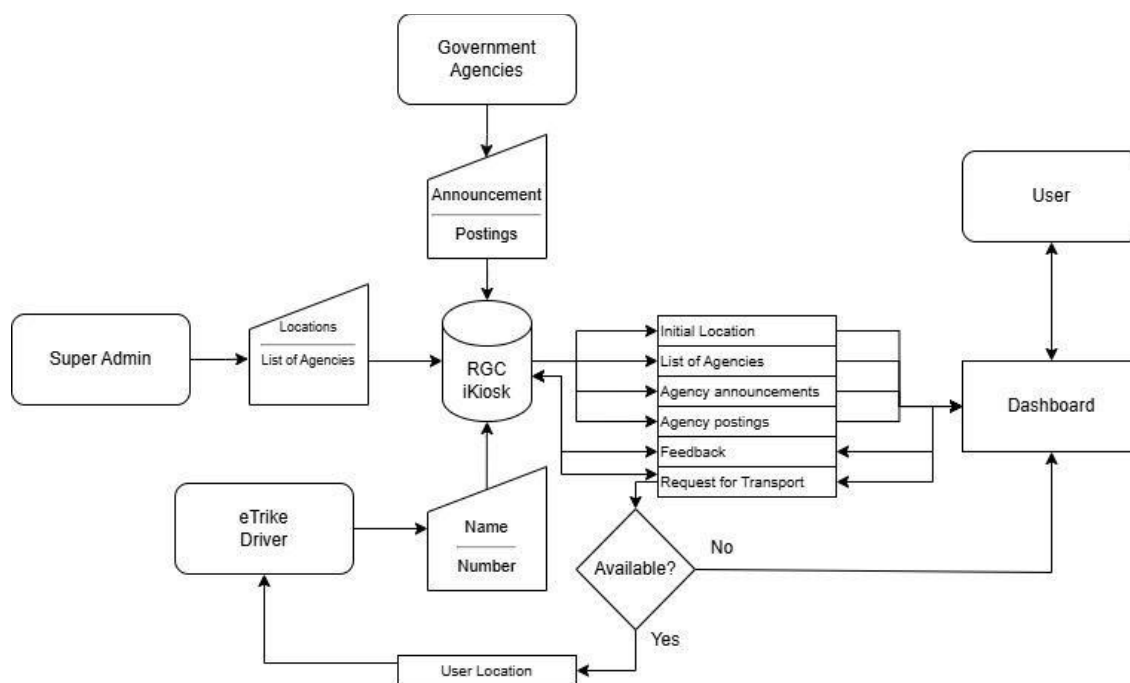


Figure 4. Data flow Diagram of RGC iKiosk

The workflow/dataflow diagram for the RGC iKiosk system illustrated how the user, the system, and the database interacted with one another. The Super Admin account(s) oversaw the iKiosk System, managed its inputs, and maintained the list of regional agencies along with their respective locations. The Government Agency-type accounts managed the posting of announcements and updates for their particular agencies, all of which were directed into the RGC iKiosk database.

The User-type accounts interacted with the iKiosk through the system dashboard and had access to various information sources, such as the initial location of offices, a listing of regional agencies, agency announcements and postings, and the ability to provide feedback on their experience with the iKiosk system. Users were also able to make transport requests, which the Driver-level account either accepted or set as pending depending on the availability of the CSU eTrike Driver.

The iKiosk system maintained the users' locations and ensured that appropriate transport was available to fulfill requests. The workflows provided sufficient exchanges of information among users, agencies, and the system, facilitating communication, transport management, and live updates within the Regional Government Center.

### Use Case Diagram

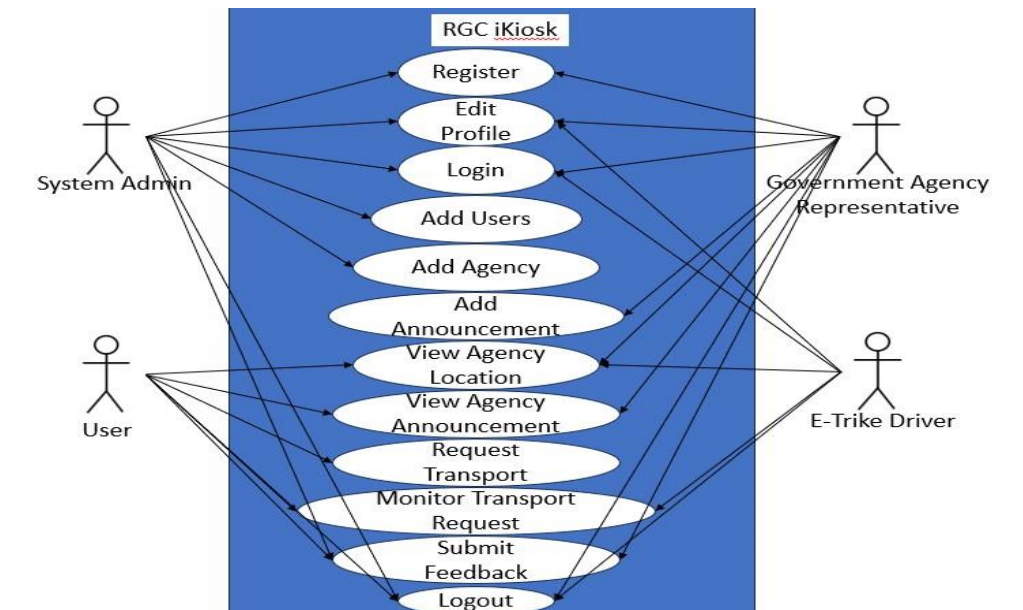


Figure 5. The Use Case Diagram of RGC iKiosk

There were four user types for the RGC iKiosk system, and each user type had a specific role that outlined the acceptable use of the system. The **System Administrator** user type allowed the user to manage the iKiosk system on the technical side, including logging in, changing profiles, adding users for Government Agency Representatives and CSU eTrike Drivers, inputting agency names, and logging out when finished.

The **User** type referred to citizens or visitors of the center. Their role included viewing the physical location of government agencies, accessing public announcements, requesting transportation assistance, seeking specific information related to agencies, and sending feedback to help improve future services.

The **Government Agency Representative** had the capability to log in, edit their agency's information, issue public announcements, send feedback, and log out securely.

The **CSU e-Trike Driver** logged in, updated their user profile, reviewed transport requests, and logged out securely.

Each user type reflected the design and framework of the iKiosk system, which prioritized accessibility, accountability, and the efficient provision of public services.

### Entity Relationship Diagram

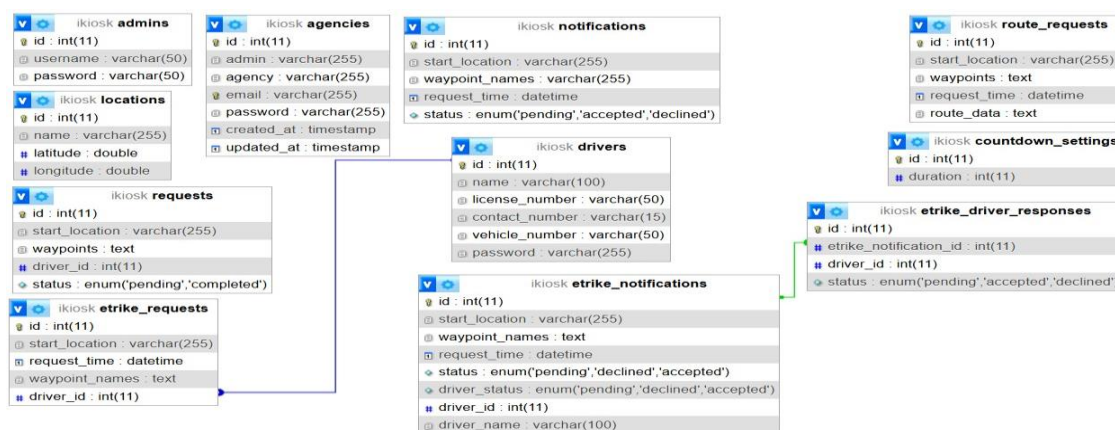


Figure 6. Entity Relationship Diagram of RGC iKiosk

The RGC iKiosk system creates unique relationships between primary roles such as Users, Super Administrators, Government Agencies, and eTrike Drivers. Each role is defined by unique data attributes and relationships with the system. Users establish their relationship to the system through actions which include submitting transport requests, submitting feedback, and checking agency information. When a user submits a request, feedback, or checks an agency, a user record is created, along with the location of the transport request, the agency they selected, or the feedback they recorded in the system.

The Super Administrator has a relationship to the system. They have responsibilities for defining the core data attributes in the system, including agency profiles, driver credentials, and access permission on accounts. The super administrator has a one-to-many relationship with agency accounts and a similar relationship with driver accounts.

The one-to-many relationship reflects an administrative role in creating and managing both agencies and drivers within the system.

The Government Agency Representatives have a relationship to the system through the submission of announcements. Agencies submit transport announcement postings and provide updates, which are published by the agency on the iKiosk dashboard for users. Each agency is able to post transport announcements on the iKiosk dashboard up to as many times needed, which establishes a one-to-many relationship. The eTrike Driver information has the relationship of users in the system through the submission of transport requests. eTrike drivers are assigned transport requests, by location availability and assigned to multiple user requests depending on service availability. The relationship of drivers to transport requests is many-to-one.

### **Data Analysis through Statistical Treatment**

The analysis of the gathered data involved the utilization of the following descriptive statistical such as the deriving the weighted mean which was used to calculate the extent of the proposed system's compliance with ISO 25010:2011 and the UTAUT2 framework. To support this, the Likert Scale was employed to obtain the point scales and descriptive equivalents of the participants' responses through the survey questionnaire. A five-point Likert Scale was utilized, with each point corresponding to a descriptive equivalent that measured the level of the system's compliance as perceived by the respondents.

### **Results and Discussions**

This chapter displays the data that respond to the specific research questions on tabular format. It includes the findings and their interpretation. The arrangement of the presentation corresponds with the sequence of the problem statement.

#### **The Current Practices, Policies, Problems**

Prior the development of the RGC iKiosk, visitors usually faced a lot of inconvenience when navigating the Regional Government Center. People often had to rely on asking directions from staff or following printed signs, which wasn't always efficient and could lead to confusion, especially for first-time visitors. When someone needed government forms, they'd typically have to visit different offices, wait in lines, and manually collect paper documents. Communication between the government agencies and the public was scattered, often limited to printed notices or word-of-mouth, making it tough to keep track of updates or announcements.

Accessibility was another concern, as not everyone could easily access information or services, especially individuals with disabilities or limited digital skills. Although the government had policies in place like the Data Privacy Act of 2012 and laws promoting accessibility, these weren't always consistently followed.

All these practices caused unnecessary delays, frustration, and a less-than-ideal experience for visitors. Recognizing these challenges inspired us to develop the RGC iKiosk which will aim to create a centralized, accessible, and user-friendly system to make navigating the government center easier and improve everyone's experience.

#### **The Regional Government Center Information Kiosk's**

##### **Features and User Roles**

The RGC iKiosk is an interactive self-service digital information system designed to improve the access and efficiency for providing government services. The iKiosk provides users with live access to digital public information, forms and public announcements which can reduce the manual work load of administrative staff and streamline how residents receive common inquiries.

In designing the iKiosk product we focused on performance and useability to properly deliver digital content we integrated intuitive navigation to create and ensure a responsive and informative iKiosk for the residents to use in public or government workspaces.

The following are screen captured of the iKiosk features of each role, respectively:

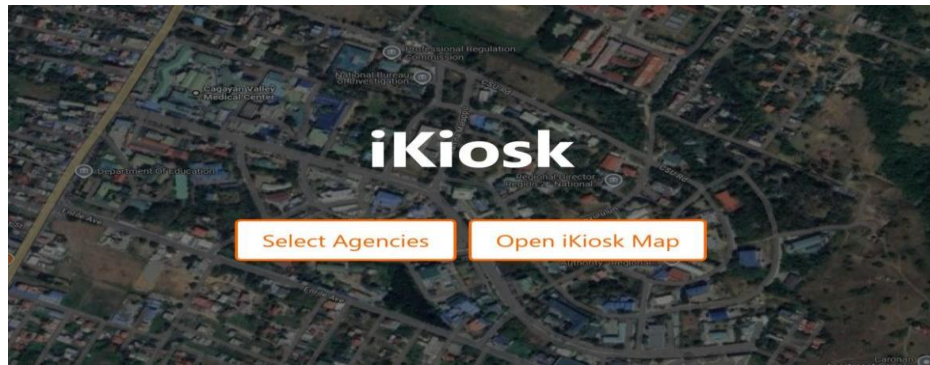


Figure 7. iKiosk Main Dashboard

Dashboard page, wherein user-level type can select for list of agency or directly opening the Map Navigation feature of the iKiosk.



Figure 8. iKiosk Map Navigational Features

Navigational page, wherein user-level type can select their route going to specific government agency. Also, they have the option to choose if they want to have multiple government agency transactions, request for transport, clear the whole transactions.

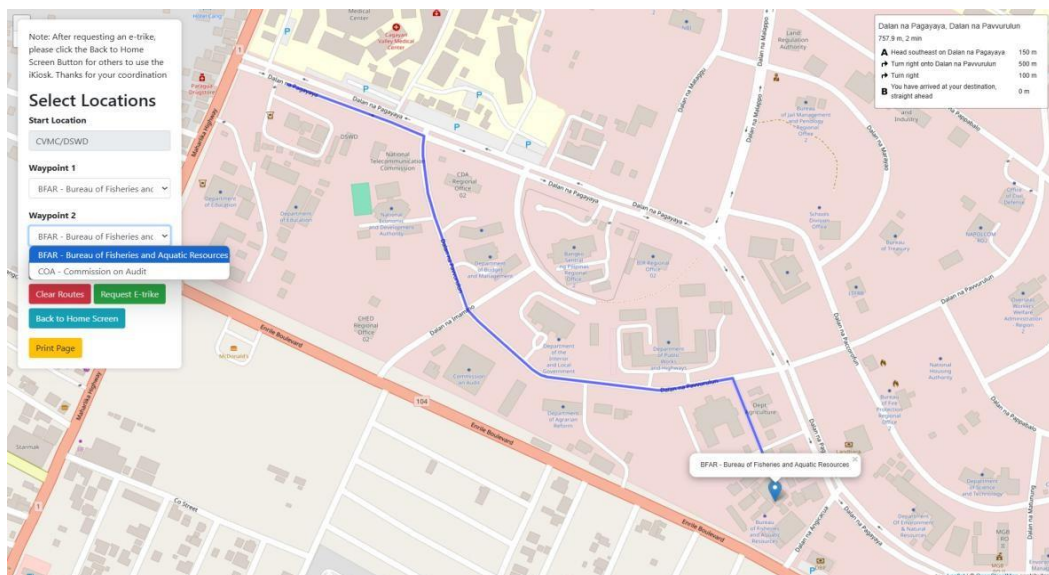


Image 9. iKiosk Map Navigational Features going to a specific government agency

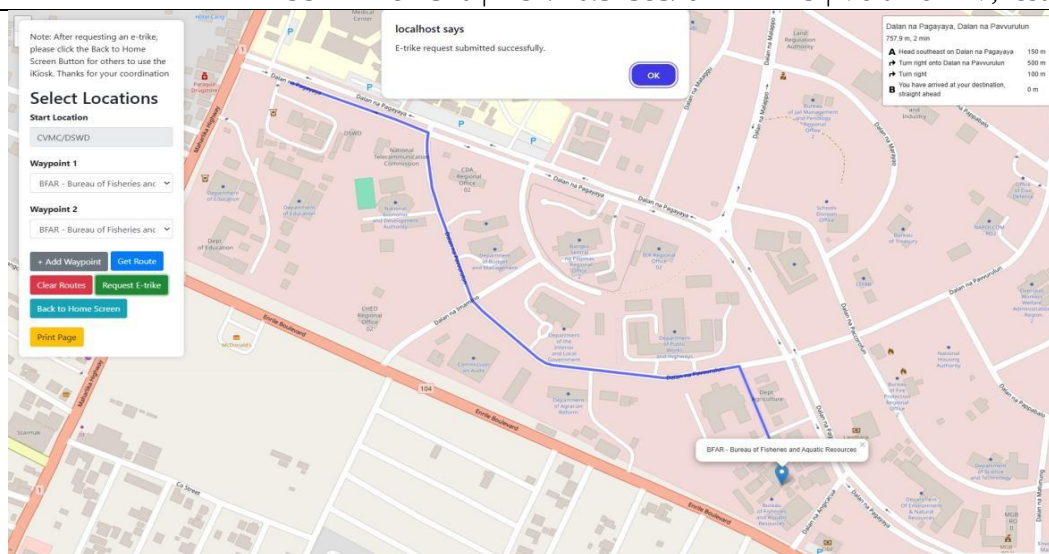


Figure 10. iKiosk Ride Hailing Technology Feature, requesting for a ride

## eTrike User

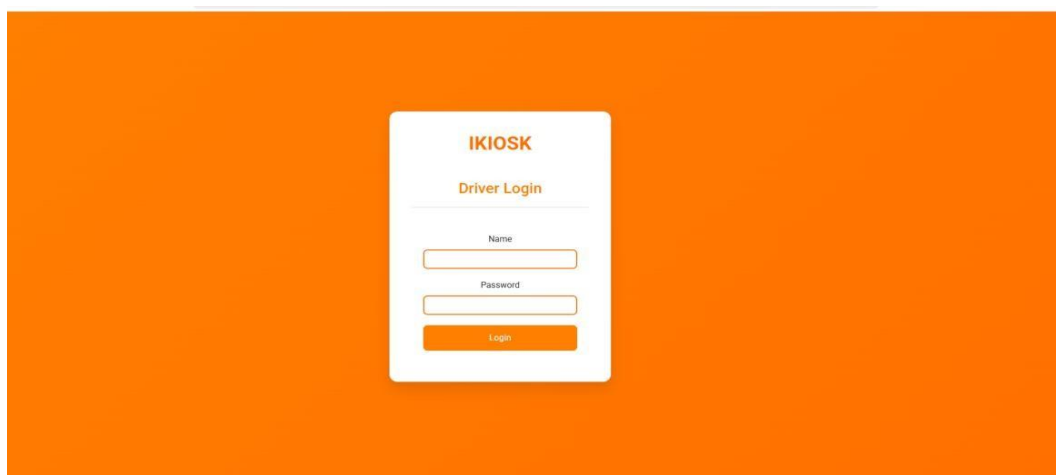


Figure 11. Log-in Page for CSU e-Trike Driver; best accessed using a smartphone.

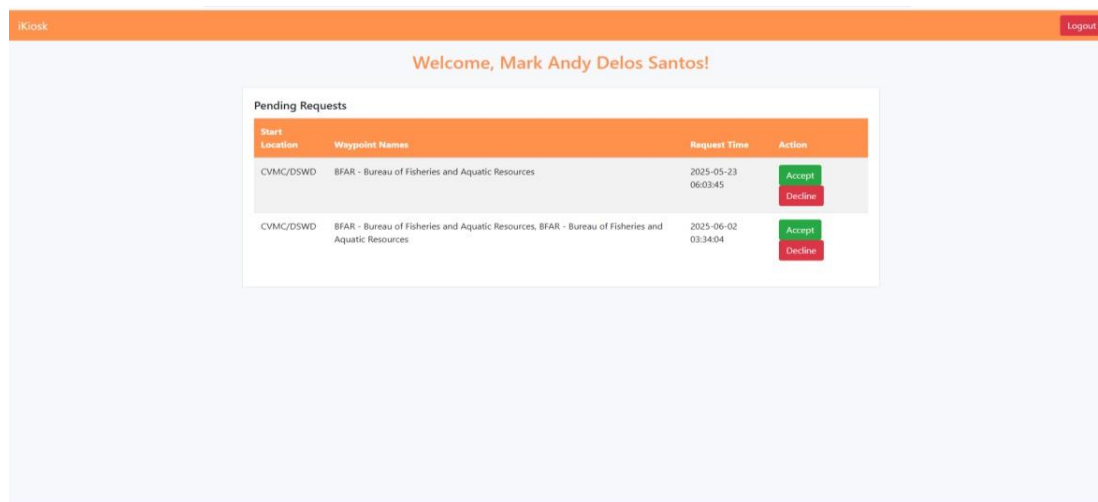


Figure 12. Dashboard wherein pending requests were displayed, also starting point and ending point were displayed to initially know the destination and pick-up location of the RGC visitor.

## Government Agency Representative

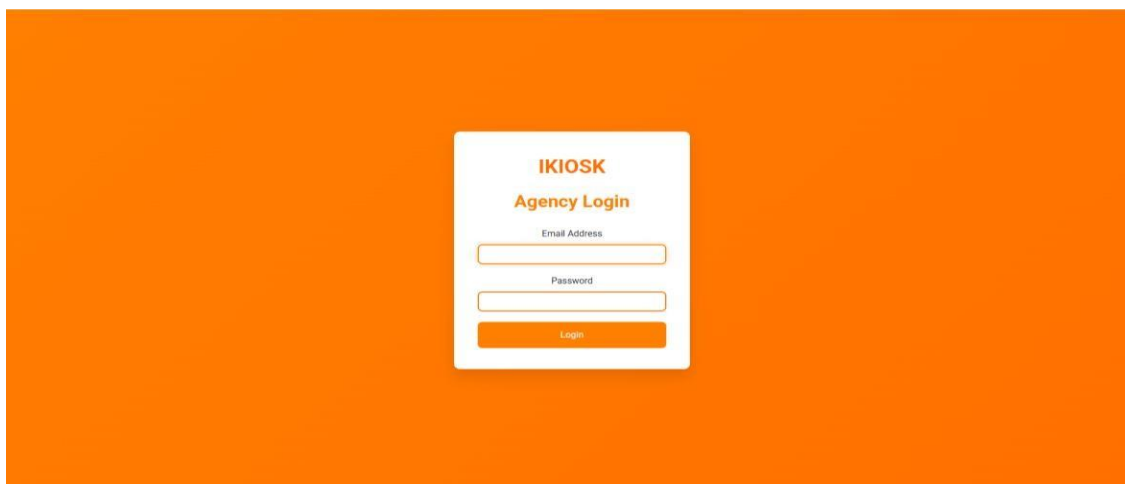


Figure 13. Log-in page for Government Agency Representative.

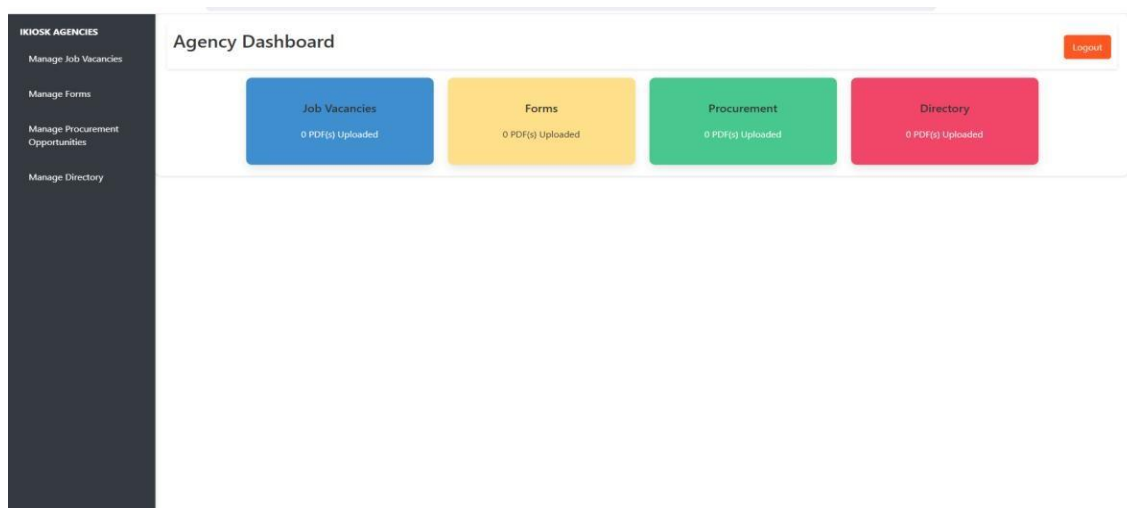


Figure 14s. Dashboard, wherein Government Agency Representative-level account can manage their agency's job vacancies, publications and directory.

### The Assessment of The It Experts and Systems Administrator Using the Iso 25010:2011 Software Quality Evaluation Tool

The following tables detailed the ISO 25010:2011 software evaluation result which focused to the following indicators: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability which was rated using a Five-point Likert Scale following the Descriptive Equivalents of 'O' as Outstanding of which the Mean is ranging from 4.20 to 5.00 and 'VS' as Very Satisfactory with the Mean ranging from 3.40 to 4.19. The assessment was conducted by two groups of users: IT Experts and System Administrators.

#### Functional Suitability

The table shows that most of the respondents rated Usefulness and Clarity the highest. System Administrators rated both aspects a perfect 5.00 and IT Experts gave a slightly lower rating of 4.70. The fact that iKiosk is functional and easy to use can be inferred from these results. Only one aspect, Completeness, was rated lowest with a weighted mean of 4.50 by both groups. Given that this aspect was still rated "Outstanding", albeit for completeness relatively lower than the other aspects, this would indicate that some position of the user felt that the system may be enhanced in terms of coverage of features and informational content.

#### Performance Efficiency

The evaluation indicates that IT Experts consistently rated across all indicators, with Efficiency receiving a weighted mean of 4.80, Compatibility a 4.70, Data Rendering a 4.50 and a 4.67 average mean classification overall, Outstanding. These ratings indicate that the iKiosk system worked faithfully well under multi-users and was able to deliver content despite timing lags. In contrast, System Administrators rated lower scores, registering a weighted mean of 4.00 for both Efficiency and Data Rendering - while Compatibility held at 4.50 - when their overall average between the three indicators was lowered to 4.17, rated as Very Satisfactory. The difference between the rated means between IT Experts and System Administrators suggests that

System Administrators experienced intermittent performance limitations, probably attributable to changes in devices or connectivity, or the instability that is generally evident when entering a system.

### **Compatibility**

The performance table displayed the outcome of the End Users' survey's indicators section. The IT Experts were the strongest group of respondents, who rated the iKiosk outcomes with the highest weighted means. Even though they rated Standard Compliance well (4.70), the highest rating of 4.80 was for Independence. This demonstrates the iKiosk can perform and operate using various devices and platforms without specific configurations. IT Experts rated Independence to indicate systems functionality, while the Systems Administrators rated Independence as their lowest question with a score of 4.00. They may not have all had the same user experience relative to their own platforms, as their experience may have differed based on the devices or browsers used. This meant that issues across devices or platforms may have created limitations in their experiences, and perhaps their scores.

The recommendation was to test the system explicitly on the devices and browsers the Systems Administrators used, including the use of operating systems such as Windows or Linux. If any issues were found, they could have been improved by further refining how the iKiosk adapted to different screen sizes, resolutions, and the type of browser used. iKiosk performance related to Independence will be raised higher on the performance table if the iKiosk loaded functionally and properly across all platforms.

### **Usability**

The table indicated that most respondents gave the iKiosk moderate ratings, in terms of iKiosk's ability to operate without supervision. The lowest rating was under the Independency indicator, where IT Experts rated a weighted mean of 3.70 (Very Satisfactory) and System Administrators rated of 3.00 (Satisfactory), for a combined mean of 3.35. This suggested that while the iKiosk could operate independently, it could not sustain performance either for long periods without supervision or in unattended circumstances.

Overall, the Functionality indicator had better ratings than Independency. IT Experts rated 4.20 (Outstanding), and System Administrators rated 4.00 (Very Satisfactory) for a combined mean of 4.10. The Optimisation indicator, which addressed the speed and responsiveness of the iKiosk, had a weighted mean of 4.10 from IT Experts and 3.50 from System Administrators, for a combined weighted mean 3.80. The ratings suggest that iKiosk could perform relatively well during normal usage however improvements might be needed to manage higher traffic or more complicated tasks.

To improve the Independency ratings, upgrading to a system that includes feature to support continuous and unattended operation would be advisable. Automatic error recovery processes, offline caching of key content and source of back-up power (solar power supply or uninterruptible power supply - UPS) would be beneficial. Such improvements would support iKiosk operating without interruptions during power outages, or in circumstances where there is no immediate access to technical staff.

### **Reliability**

In conclusion, the table indicated that the majority of the participants rated the content positively along each of the three variables. Informativeness had the highest rating at 4.90 from IT Experts and 5.00 from System Administrators. This suggested that the prompts, help messages, and recommendations are deemed very useful by users and delivered effectively. Readability received very high scores at 4.60 from IT Experts and 5.00 from System Administrators, this suggested that the content itself was not densely packed and easy to follow. A lower rating was shown under Accuracy. IT Experts rated this indicator at 4.80 and System Administrators had a much lower rating at 4.00; this seemed to indicate that from an administrator's point of view, the content may not be updated or consistent on a regular basis. Even though there was the discrepancy, both scores fell under the indications of "Very Satisfactory" and "Outstanding." Overall, the total weighted mean from IT Experts was 4.77 and 4.67 from System Administrators for an overall mean average of 4.72. This all supported the conclusion that the iKiosk system was indeed effective in providing content that was accessible, informative, and user-friendly. The lowest rating provided by the System Administrators under the Accuracy indicator revealed content that required more frequent updates.

### **Security**

The table showed that most of the respondents provided moderate scores across the three security-related indicators. Data Security received the highest rating with a weighted mean of 4.00 from IT Experts and a mean of 3.50 from System Administrators which resulted in an overall means reported at 3.70. The results showed that the iKiosk system had basic security measures built in with data protection and audit logging being implemented, regardless of the differences in perception "effectiveness" of the security coverage in each group.

Accessibility had the lowest score, with IT Experts and System Administrators scoring equally at 3.50. These results indicated that the iKiosk had accessibility controls in place but did not appear to have configured user roles well, specifically for setting administrative rights or protecting sensitive settings.

Reporting was also rated as moderate with IT Experts scoring Reporting at 3.60 and System Administrators scoring Reporting at 3.50. The ratings reflected that the structure and security of reports and other outputs were deemed acceptable but could be better.

The overall weighted mean at 3.60 rated in the Very Satisfactory range. The results indicated that iKiosk had provided basic access controls and security measures but also indicated places there could have been better access controls or improved security measures.

### **Maintainability**

The table revealed that most respondents gave favorable ratings in Serviceability and Documentation, with the highest rating in Serviceability, where IT Experts rated it as a 4.50, and showed that they were confident in the iKiosk's maintenance and upgrade/updates even if it is not technical. Documentation was rated closely and in that IT Experts rated it as 4.40 which demonstrated that the manuals, help guides and linked references were helpful in supporting the users through the system's navigation and operation. The lowest ratings were from System Administrators, who rated Serviceability a 4.00, and Documentation a 4.00, and both placed their ratings in the Very Satisfactory category. This made it apparent that while the system is operational and supported with guides, some administrative users still require technical assistance in some areas of their tasks or upgrades/updates, or they just don't feel their documentation targeted their specific needs.

### **Portability**

The table indicated that overall respondents gave all technical flexibility indicators very high ratings. The highest rating was in the Transition indicator, with IT Experts rating at a weighted mean of 4.90 and System Administrators rated at a mean of 5.00, resulting in a combined mean of 4.95. This rating showed that the iKiosk system was very transportable and could easily be plied over multiple workstations or web hosting environments. This also indicated the iKiosk system was ready for multiple agency or office use. The lowest rating was for the Compatibility indicator, for which System Administrator rated a 4.00 and IT Expert rated a 4.90, resulting in a combined rating of 4.45. The combined mean still fit within the Outstanding category, however, the lower rating from administrative users indicates that some of them may have had challenges involving specific devices, screen sizes, or specific browser setups that negatively affected performance.

In the Easily Re-install indicator, IT Expert rated 4.40 and System Administrator rated a 4.00, giving a combined average of 4.20 for this indicator. These ratings indicated that the iKiosk system could be reinstalled with minimal difficulty, although some users may have still required a bit more guidance or even basic technical skills to assist them in making the re-installation experience as smooth as possible.

The overall weighted mean was 4.53, placing the system within the Outstanding range. The results confirmed that the iKiosk was designed with strong technical flexibility and dependable reusability. However, to address the lower rating in Compatibility, it was recommended that a clear installation and setup guide be created, including a compatibility checklist for devices, screen resolutions, and browsers.

### **The Assessment of the Users, Government Agency Representatives, And CSU e-Trike Project Drivers using the Unified Theory of Acceptance and Technology 2 (UTUAT2)**

The following tables detailed the UTUAT2 evaluation result which was focused to the following indicators: System Performance, Effort Expectancy, Social Influence, Facilitations, Hedonic Motivation which was rated using a Five-point Likert Scale following the Descriptive Equivalents of 'O' as Outstanding of which the Mean is ranging from 4.20 to 5.00 and 'VS' as Very Satisfactory with the Mean ranging from 3.40 to 4.19. The assessment was conducted by two groups of users: RGC Visitors, Government Agency Representatives, CSU Carig Campus' E-Trike Drivers.

#### **System Performance**

The table presented that among the three performance indicators, Operational Efficiency received the highest weighted mean of 4.73, followed by Information Accessibility at 4.67, and Information Accuracy at 4.58, all falling within the Outstanding range. These results indicated that the iKiosk system had effectively improved workflow processes and access to information for its users. The e-Trike Drivers gave the most favorable scores, with perfect ratings of 5.00 in both Operational Efficiency and Information Accessibility, and 4.80 for Information Accuracy. These figures showed that the ride-hailing feature greatly assisted their daily operations by improving task coordination and reducing both idle and waiting times. Government Agency Representatives also provided high marks, particularly in Operational Efficiency at 4.80 and Information Accessibility at 4.60. Their rating for Information Accuracy was 4.40. Users or Center Visitors showed consistent satisfaction, with ratings ranging from 4.39 to 4.53 across all indicators. This reflected a strong level of agreement regarding the system's usefulness in accessing government service details and booking transport.

#### **Effort Expectancy**

Among the indicators, Information Accessibility obtained the highest overall weighted mean of 4.70 (O), indicating that users across all roles found the iKiosk system highly effective in making relevant government information easily accessible. Notably, Government Agency Representatives rated this indicator with a perfect 5.00 (O), affirming the system's effectiveness in

facilitating real-time information delivery and broad public access to postings and updates. In terms of Information Accuracy, all groups shared a consistently positive perception, as reflected in the overall weighted mean of 4.65 (O). Both Agency Representatives and E-Trike Drivers gave a score of 4.80 (O), suggesting that the information displayed and transmitted through the system is regarded as reliable and

timely. This helps the iKiosk's capability to deliver consistent outputs that support both mobility services and public-use announcements. Operational Efficiency had a slightly lower but still respectable mean score of 4.50 (O). This indicates that while the iKiosk facilitates user interaction and task performance, there is some room for improvement with regards to system responsiveness and reduced redundancy in task performance. Even though government personnel rated this aspect at 4.60 (O), all general users and drivers rated it slightly lower. This could be indicative of some differences between either stakeholders with regards to the approximate workload and/or speed of access while interacting with the system.

All in all, all total average weighted mean across all stakeholder is 4.62 (O), which says a lot about multiple aspects of usability and overall intended usability of the RGC iKiosk. The high values signify strong attributes for fundamental usability attributes such as Learnability, User Interface Design Quality, and Ease of Navigation. All components in facilitating interaction between system and user. This suggests that the iKiosk is uniquely positioned to providing an easy-to-use, accessible, and accurate service platform for all stakeholders.

### **Social Influence**

The results indicated that 4.80 was the highest overall weighted mean delivered by Government Agency Representatives and CSU-Carig e-Trike Drivers, which indicated their high degree of confidence toward the usefulness of the iKiosk and its effect on communication and service delivery, which all demonstrated acceptance of and improvement in workflows, response times, and user satisfaction. In contrast, the lowest overall weighted mean was recorded by RGC visitors (Users) at 4.32, which, while still within the Outstanding range, suggested that this group may not have experienced the full benefits of the system as effectively as the others. Their slightly lower score likely stemmed from limited access to or awareness of the platform's broader functionalities. To address this, a specific recommendation would be to implement interactive guided tours directly on the kiosk interface, triggered during a user's first interaction. These walkthroughs could highlight key features such as agency locator tools, transport requests, and announcements. Additionally, placing visible signage with QR codes linking to tutorial videos near the kiosks could have helped visitors better understand the system's full capabilities, leading to greater appreciation and a stronger likelihood of promoting it.

### **Facilitations**

The results indicated that the highest overall weighted mean was 4.80, received by CSU-Carig e-Trike Drivers for the indicators of Support Clarity and Ease of Support. This indicated that the support components of the iKiosk were effectively accessible and useful to them in terms of their pragmatic, operational needs and provided clear support and support clarity, to allow them to complete tasks without confusion.

The lowest overall weighted mean was by the Users or RGC visitors, with means of 4.30 for Support Clarity and 4.21 for Ease of Support. They reported outstanding means for the indicators overall, just slightly less than the other user groups. Their means suggested the visitors may have, on occasion, experienced unclear instructions, or had difficulty in locating support, while using the kiosk in an independent manner.

To address this, the respondents offered context-based help buttons located beside each major function on the user interface, have plain-language explanations, establish animated pop-up guides for first time users, and place simple instructional panels in local dialogue beside the kiosk. These provisions would have helped clarify the kiosk for visitors unfamiliar with using digital tools, and would increase visitor satisfaction and comfort.

### **Hedonic Motivation**

The results showed that the highest overall weighted mean was 4.67, recorded under the Interface indicator. This confirmed that users across all roles found the iKiosk system visually well-structured, intuitive, and easy to navigate. Notably, Government Agency Representatives gave a perfect score of 5.00, highlighting the iKiosk's efficiency in supporting their content management tasks through a clear and functional layout. The lowest overall weighted mean was observed in the Ease-of-Use indicator, at 4.39, which still within the Outstanding range was slightly lower compared to the other areas. Users rated this aspect at 4.38, and Agency Representatives at 4.40, suggesting that while the system was generally user-friendly, there were minor challenges, particularly for first-time users or those less familiar with digital interfaces. To improve this, a suggestion was to integrate a step-by-step onboarding pop-up that automatically launched during a user's first interaction with the system. This guide could have walked users through key features such as agency lookup, transport requests, and announcements. Including touchscreen tips and visual indicators (like icons with short text labels) would have further assisted visitors in navigating the kiosk with ease, especially those unfamiliar with similar systems.

**Summary of Findings**

Overall, the assessment of the RGC iKiosk system using the ISO 25010:2011 software quality model and the UTAUT2 framework showed consistently good results on several quality indicators. The system received Outstanding ratings across most categories confirming functionality, reliability and suitability for its intended users, including IT professionals, system administrators, e-Trike drivers, and visitors to the center.

According to the ISO-based evaluation, the system received a weighted mean above 4.70 in the areas of Functional Suitability, Portability, and Reliability after the ratings were transformed into an equivalent numerical scale from 1 to 5 (the systems received numerical means of 4.89, 4.75, and 4.70, respectively) confirming the system provided its basic functions, worked well across the devices the users wanted to view the content on, and provided clear and accurate output. Similarly, in the UTAUT2 evaluation, categories such as System Performance, Effort Expectancy, and Hedonic Motivation exhibited an Outstanding to Superior rating, confirming the system was intuitive, engaging, and easy to access across a variety of stakeholder groups.

On the other hand, the evaluation also indicated one of the lowest scores in the Usability category, that being the Independency indicator, which received an overall weighted mean of 3.35, rated as Very Satisfactory. This rating suggested while the iKiosk performed generally well, it had difficulty operating independently; that is, able to operate without supervision or some constant power source. There was concern, particularly among system administrators, who might be tasked with the care and upkeep of the kiosk regarding intermittent power loss or diminished technical capability for support on-site.

To this end, the researcher suggested the installation of a solar-powered power supply at the iKiosk physical station based on these results. This installation was intended to provide a continuous, stable power supply, and be operational regardless of whether there was electrical service. Adding a renewable solution to the iKiosk system's residency installation was anticipated to improve both the iKiosk's independency and operational reliability; two aspects that were a clear concern in the evaluative process of the RGC iKiosk system.

**Conclusions and Recommendations****Conclusion**

The results of this study highlight a critical need for a central electronic platform (like the RGC iKiosk), within the Regional Government Centre. Based on both quantitative user data and stakeholder feedback, it is evident the system addresses with success the prior deficiencies in service delivery that created inefficiencies and gaps in how the public engaged with government offices. Before the development of the kiosk, visitors to the RGC Centre were often challenged by poor signage, lack of coordinated announcements, and essentially being forced to rely on government staff, just to get information about how to navigate the Centre or even access basic information. This created a manual and inconsistent system that resulted in delays and frustration, particularly among first time users.

The RGC iKiosk provided a reasonable solution to long-standing challenges. It added a more coordinated way of retrieving government forms, announcements, contact information, and even transportation services (via novel technology to the Centre) through a single system. Satisfaction survey data yielded high scores across areas related to functional dependability, ease of use, and system performance. They demonstrated reliability based upon ISO 25010 quality benchmarks and UTAUT2 framework that matched user expectations and provided reliable and dependable service to different types of users (general public, designated administrators and transportation operators). Beyond its operational benefits, the iKiosk contributes to broader development goals. It supports the Philippine government's long-term vision under *Ambisyon Natin 2040*, which seeks to ensure a stable, comfortable, and secure life for all Filipinos. The system also reflects global priorities under the United Nations Sustainable Development Goals (SDGs), particularly those promoting digital innovation (Goal 9) and stronger, more inclusive institutions (Goal 16).

However, one aspect that emerged as an area for improvement was the kiosk's capacity to operate without interruption during power outages. The Independency factor under the Usability category scored lower than other indicators, signaling the need for a backup solution. In response, the research proposes the integration of a solar-powered energy system to ensure that the kiosk can continue operating even during electrical disruptions. This not only enhances the system's reliability but also supports environmental sustainability and service continuity.

In conclusion, the RGC iKiosk represents smart and timely innovation that fills longstanding service gaps created by the Regional Government Center. Improving accessibility, eliminating manual processes, and harmonizing itself to both local and global desired development goals, the system has demonstrated its utility as an effective service delivery tool that enhances public service delivery. An iKiosk is inherently a simple ICT system, and its technological evolution will ease the normative shift towards an institutional program, and is making positive strides toward building a more inclusive, responsive, and future government platform.

**Recommendations**

Based on the findings from this study, the following recommendations were proposed to enhance the system further:

For the host of the system DOST2, it is recommended to install a solar panel with battery backup at the RGC iKiosk station to provide uninterrupted power, especially in areas prone to outages, ensuring continuous service even during electrical disruptions.

For the Researcher, develop illustrated user guides in both digital and printed formats, to be displayed beside the kiosk and accessible through its main interface, guiding users through step-by-step procedures for navigation and service requests.

For future researchers, it is recommended to explore the integration of artificial intelligence features such as chat-based assistance or automated service routing, which may further enhance the kiosk's usability. Additionally, they may consider expanding the scope of deployment to other regional centers and conducting longitudinal studies to evaluate the long-term effectiveness, user behavior trends, and sustainability of the iKiosk in broader government settings.

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