

Buk CaTrike: A Mobile Application Analyzer for Metro Vigan

Honer Girl Aninag Avo, Amando Pimentel Singun

ABSTRACT--- Gone were the days when the word travelling would be mostly associated to businesspersons and trade. Nowadays, getting from point A to point B is much convenient with the various modes of transport available to the public. Way back during the Spanish colonization, the use of calesa was introduced, made available to the upper-class of the society and it was soon declined in Second World War. During the American occupation, where the advancements arrived, the use of jeeps, cars, bus, and trucks were prevalent and these modes are still popularly to this day. Ilocos Sur's Vigan City was enlisted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as one of the best-preserved heritage sites in 1999 and entitled as one of the Seven New Wonder Cities of the World. It is on this note that the researchers have decided to develop Buk CaTrike, a booking application for Vigan calesas and tricycles. The researchers intend to determine the quality evaluation of the Buk CaTrike application using the ISO 25010:2011 Framework, as perceived by various stakeholders, specifically the kutseros, tricycle drivers, commuters and tourist.

Furthermore, the researchers made use of descriptive and software development design in order to gather information needed to test the hypothesis or answer the questions concerning in developing the Buk CaTrike: A Mobile Application Analyzer for Metro Vigan, the Interaction Design Model as Systems Development Life Cycle (SDLC) as a guide in the development of the application.

Keywords—Booking Application, Mobile Application Analyzer, Transportation

I. INTRODUCTION

In the prevalence of social media along with the trend of hashtags such as #vacationmode, #travelgram, and #instatravel would normally pop up in one's feed, accompanied with tourists shots posted by family and friends. Gone were the days when the word travelling would be mostly associated to business personalities and trade. Nowadays, getting from point A to point B is much convenient with the various modes of transport available to the public.

In the Philippines, transportations developed like that of other places. During the Spanish colonization, the use of calesa was introduced, made available to the upper-class of the society. Soon its use declined after the Second World War. During the American occupation, the use of jeeps, cars, bus, and trucks were prevalent and these modes are still popular up to this day.

Although the Philippines may have come a long way from being a Spanish territory, the colonizer's influences are still evident in the religion, language, and structures in some of the provinces of the country. One of the provinces known to

have preserved its Spanish heritage is the Ilocos region, specifically Ilocos Norte and Ilocos Sur.

Ilocos Sur's Vigan City was listed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as one of the well-preserved heritage sites in 1999. It was also adjudged as one of the Seven New Wonder Cities of the World because of its rich cultural and historical heritage.

Vigan city is the most visited part of Ilocos Sur because it offers abundant tourist destinations and native delicacies. Tourists visit tourist spots by riding in calesas or tricycles since these are the main public transportation in the city. As such, calesas play a part in the "historical" journey of tourists. On the other hand, tricycles are the most commonly used public transportation in provinces and cities, including Vigan City.

Vigan City has sufficient transport system. Four bus companies—Dominion Bus Corp., Partas Trans. Co., Viron, and Aniceto Transportation—are operating within its vicinity. They have direct bus services from Vigan City to Manila, Baguio, Laoag, and other parts of Luzon.

There are specified parking areas and fare matrices for tricycles and calesas in Vigan City. However, tourists raised concerns on the non-compliance of drivers to the established fare rates provided by the City Council through existing transportation ordinances. One possible solution to address such concerns is the integration of technology in the booking and monitoring of vehicles that are for hire. Adapting such technology may not pose problems to the locals and tourists of Vigan City since almost everybody owns a smartphone, tablet, or Internet-connected personal computers.

It is on this note that the researchers have decided to develop *Buk-CaTrike*, a booking application for Vigan calesas and tricycles to help minimize the issues faced in terms of transportation in the city.

Any newly developed transportation booking application, however, must go through Quality Evaluation. Hence, the researchers measured the quality of the *Buk-CaTrike* Application using the ISO 25010 Framework, as perceived by various stakeholders, specifically the *kutseros*, tricycle drivers, commuters, and tourists.

This new application will ensure that the fare matrix approved by the Vigan City Council are followed. It likewise offers a more systemized and convenient transportation experience for both locals and tourists. It is but fitting that a city with an old world charm takes advantage of technology to remain current with the rest of the world.

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Honer Girl Aninag Avo, University of Northern Philippines.
(E-mail: hgsaninang@unp.edu.ph)

Amando Pimentel Singun, Higher College of Technology, Muscat. (E-mail: Amando-Singun@hct.edu.om)

CONCEPTUAL FRAMEWORK

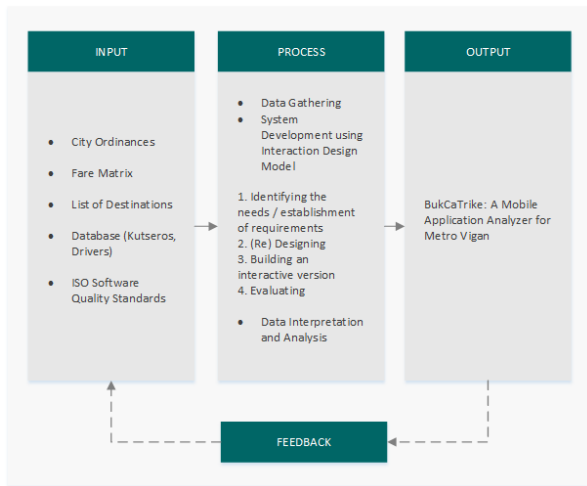


Fig. 1. Conceptual Paradigm

The figure above illustrates the input-process-output of the study, wherein the input represents the data needed in developing the *Buk-CaTrike*. After evaluating the mobile application, feedbacks were solicited from the stakeholders to help improve its features and functionalities.

The process involves around data gathering, data interpretation and analysis, and Interaction Design Model (IDM), which is a Systems Development Life Cycle that has four (4) phases, namely: (1) Identifying the needs for establishing requirements, (2) (Re) Designing, (3) Building an interactive version, and (4) Evaluating.

After which, the output will be the *Buk CaTrike: A Mobile Application Analyzer for Metro Vigan* that the researchers thought could help the City Government in reducing the overpricing of tricycle driver’s and *kutseros*. The mobile application analyzer model is illustrated below.

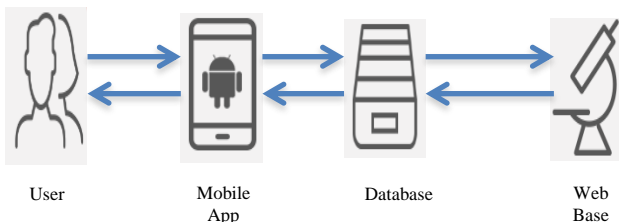


Figure 2. Mobile Application Analyzer Model

Mobile application analyzer is designed to track the progress of the booking of a certain commuter and the appropriate fare of a specific destination.

The ISO 25010: 2011 software quality model identifies eight main characteristics and every characteristic has its sub-characteristics. This model is used in figuring software characteristics for quality control, quality assurance, and performance improvement.

Furthermore, the researchers made use of the Interaction Design Model as Systems Development Life Cycle (SDLC) for the development of *Buk CaTrike: A Mobile Application Analyzer for Metro Vigan*.

Statement of the Problem

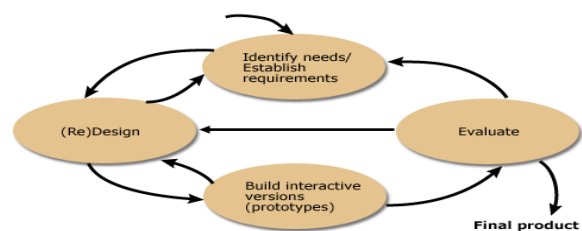
This study titled “*Buk CaTrike: A Mobile Application Analyzer for Metro Vigan*” sought to answer the following research questions:

1. What are the problems / issues and challenges encountered by the commuters in terms of transportation, drivers, and fare matrix in Metro Vigan?
2. What proposed system can be developed to address the identified problems and issues encountered in the existing system?
3. What is the extent of compliance of the developed application to ISO 25010 Software Quality Standards?
4. Is there a significant difference in the extent of compliance of the developed application to ISO 25010 Software Quality Standards as assessed by the IT experts and users?
5. What are the strengths and weaknesses of the proposed system?

Research Design

The use of the system development methodology plays an important role in developing a system. Having used such methodology in this study made it a developmental research. In order to develop *Buk CaTrike: A Mobile Application Analyzer for Metro Vigan*, the developer believes that there should be a specific project management methodology that should be used to direct the developer in designing and developing the system.

The Interaction Design Model, a user-centered design approach that focuses the interaction between the user and the product, had been used in this study. It has four phases, namely: (1) identifying the needs and establishing requirement, (2) (Re) Designing, (3) building an interactive version and lastly, and (4) evaluating. Figure 3 shows the Interaction Design Lifecycle Model



Identifying the needs and establishing requirements.

This is the first phase in which the system requirements and objectives are determined and necessary information is gathered. The objectives and other specifications are fixed in order to decide which strategies or approaches are to be followed during the project life cycle.

During the Identifying the needs and establishment of requirements phase, the researchers gathered necessary information needed in the design and development of the system. These include business needs, processes, and rules. Interviews were conducted to determine the requirements of the stakeholders.

(Re) Designing. This is the second phase of the Interaction Design Model which is considered as the most important part. It is also when the software specification is identified. After the developer has collected the needed information, preliminary design is created.



During this phase, the developer identifies and resolves all the possible risks in the project development. If risks indicate any kind of uncertainty in requirements, prototyping may be used to proceed with the available data and find out possible solution in order to deal with the potential changes in the requirements.

Build an interactive version. This is the phase of Interaction Design Model in which the development of the software based on plan and design is being followed.

In this phase the researchers started coding and creating what the end users want based on the interview and the information gathered.

Evaluation. This is the last phase of the Interaction Design Model. This phase is the same with that of the testing phase in the water fall model, wherein the developed product is passed on to the customer in order to solicit their comments and suggestions through a questionnaire.

Through this phase the developer can identify and resolve potential problems or errors in the software and can do the necessary revisions of the program.

The researchers had chosen Interaction Design Model as a development model because the study is a user-centered application and needs to satisfy the end user and meet the goals of the user.

In this study, the analysis of the current status on the use of *calesa* and tricycles in Vigan City is done. Also, the quality of the newly-developed *Buk CaTrike* was evaluated.

RESEARCH PARTICIPANTS

The research participants of the study consisted of the end users like the commuters, tourists, *kutseros*, tricycle drivers, and all the people who are users of the system. The research participants are individuals representing such large groups. They are classified into these categories: *kutseros*, commuters and tourists, tricycle drivers and IT Experts.

Participants	Population (N)	Sample (n)	Frequency (f)	Percentage (%)
Kutseros	135	101	101	14.49
Commuters	3000	353	353	50.64
Tricycle Drivers	496	221	221	31.71
IT Expert	25	22	22	3.16
Total	3656	697	697	100.00

Based on Table 1, the highest percentage is 50.64% under commuters with a sample of 353, the second highest percentage is 31.71% under tricycle drivers with a sample size of 221, the third has 14.49% under *kutseros* with a sample of 101 while the lowest percentage goes to IT Expert - which garnered a 3.16% with a sample of 22. Since, the researchers developed a transportation system, the sample are much higher in commuters because the researchers needed someone who have had an experience on riding the different transportation that is present in Vigan City. Hence, their feedback is prioritized in developing the *Buk-CaTrike* application.

II. RESULTS

I. Challenges encountered by the Commuters in terms of Transportation, Drivers, and Fare Matrix in Metro Vigan

On Environment - lack of parking space for vehicles; no designated parking space for *calesa*; heavy traffic is evident.

On Business - over charging of tricycle driver's and *kutseros* on fare; lack on strict implementation of City ordinances on transportation

On Human Resource - lack of closed monitoring to tricycle driver's and *kutsero*'s on the implementation of the fare matrix; trained tricycle driver's and *kutsero*'s as tour guides

II. Developed System to address the identified problems and issues encountered in the existing

The development of a *Buk CaTrike* addresses the cited problems and concern that was met in the current system. The researchers developed a mobile application analyzer that could lessen the burden of commuters or tourists in determining the transportation fare matrix in the said city. This application offers an option that the user interacts with to book a ride to a specified destination anytime at their convenience and also, it is a stress free for the riders because this application and its fare is aligned on the city government's fare matrix.

Furthermore, this application is compatible to mobile application that is portable and user friendly like the *Grab* that is widely used worldwide.

III. Extent of compliance of the developed application to ISO 25010 Software Quality Standards

The developed application complied to a great extent on the ISO 25010: Software Quality Standards in terms of functional sustainability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

IV. Test for Significant Difference in the Extent of Compliance of the Developed Application to ISO 25010 Software Quality Standards as assessed by the IT Experts and Users

There is no significant difference in the extent of compliance of the Developed Application to ISO 25010 Software Quality Standards namely functional sustainability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability as assessed by IT experts and the users.

V. Strengths and Weaknesses of the Developed System

The strengths and weaknesses of the developed application was given by commuters, tourists, tricycle drivers, *kutseros*, and IT experts who evaluated the system and were ranked according to their frequency count.

On Strengths – user friendly and innovative, passengers are aware of the rate, less hassle, informative, can chat and call the driver and vice versa, can view the map and the distance of the passenger and the driver or *kutsero* and the aesthetic effect is nice.

On Weaknesses – it should be implemented and supported by the Government, the system should cover the whole Ilocos Sur, the system can be use offline.



III. CONCLUSION

The developed Buk CaTrike: A Mobile Application Analyzer is an android application that provides solutions for the problems in Metro Vigan as this serves as an instrument to facilitate the implementation of city ordinances regarding the fare matrix on tricycles and as well as to monitor the behaviors of the registered drivers. It uses Top Nodes algorithm to ensure the precise booking of tricycle for every users. The developed mobile application is fully compliant to the requirements of ISO Software Quality Standards.

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