

**ONLINE-BASED MAPPING DIRECTORY SYSTEM FOR UNITED MOONWALK
VILLAGE HOMEOWNERS ASSOCIATION, INC. (UMVHAI)**

**Eduard Joshua S. Laranja
Jenny S. Maluping**

An undergraduate thesis submitted to the faculty of the Department of Computer Studies, Cavite State University – Bacoor City Campus, City of Bacoor, Cavite in partial fulfilment of the requirements for the degree of Bachelor of Science in Computer Science with Contribution No. **BSCS-2018-19-006**. Prepared under the supervision of Ms. Ely Rose P. Briones.

INTRODUCTION

As time goes by one of the valuable materials that had been imagined was a locator outline. It is a straightforward guide utilized in cartography to demonstrate the area of a specific geographic region. These days, locator delineate updated into online locator benefit that found in sites of organizations with various areas that enables guests to the webpage to discover areas of the business that additionally gives vital data about every area, including its location, benefit it gives, and now and again headings to the area.

Homeowners Association is a group of homeowners in a common building or common subdivision that are responsible for community rules and common area maintenance. It is a small group of real estate agents, builders and developers who control and repress the residents of a suburban neighbourhood. The aim and purpose of the association is to maintain the profitability of the real state and to managing, selling houses and lots in a residential subdivision. Homeowners Association is organizational of a number of people in a housing development who conspire to control their neighbours and prevent any sense of community in that neighbourhood.

According to an interview conducted to some UMVHAI staffs of Moonwalk Village, most of the people visiting the Moonwalk Village were not familiar of houses, so visitors tend to ask for direction at the guard of Moonwalk Village. As a result, visitors experienced a lot of problems when it comes in finding the designed location of particular houses or street. First, people consumed too much time looking for a house that was not familiar to them. Second, the Moonwalk Village is huge for them to find the owner of the houses they want to visit. In some cases, people encountered wrong information on the direction that was given at the guard of Moonwalk Village.

Based on the situation stated, an idea of developing Online Based Mapping Directory System for United Moonwalk Village Homeowners Association Inc., (UMVHAI) concluded. The system would show the directions of houses or streets at Homeowners Association which served as guide for every visitor. It would also provide a Temporary Ticket which served as a gate pass of every visitor in village. The Temporary Identification Card (ID) for walk-in visitors and Temporary Card for vehicle served as for storing information data of every visitor. By developing an Online Based Mapping Directory, there would be an ease for United Moonwalk Village Homeowners Associations Inc., (UMVHAI) to accommodate the visitor on the village, also to ease the time of guard by giving direction to the visitor on whole village.

Statement of the Problem

Generally, the study seek to answer the following problems:

1. How would be problems encountered by the people who visits the United Moonwalk Village Homeowners Association Inc., (UMVHAI) be identified?
2. How would the problem be analyzed?
3. How would the system be designed?
4. How would the system be developed?
5. How would the system be evaluated?

Objectives of the Study

The study aimed to develop an Online Based Mapping Directory System for United Moonwalk Village Homeowners Association Inc., (UMVHAI).

Specifically, the study also aimed to:

1. Identify the problems encountered by the visitor of Moonwalk Village through interviews;
2. Analyze the identified problem through the developing of Online Based Mapping Directory System for United Moonwalk Homeowners Association, Inc.
3. Design the system with the used of Fourth Generation Technique (4GT);
4. Develop the system using of PHP: Hypertext Pre-processor as programming language 5.6.12 and MySQL as storing data of the system, ArcGIS Online for 2D mapping of village, Adobe Photoshop CS6 Portable for image editing and Adobe Flash Professional CS4 for animation of line path; and
5. Evaluate the system using the W3C (World Wide Web Consortium).

Theoretical Framework of the Study

Figure 1 shows the Theoretical Framework of Online Based Mapping Directory System for United Moonwalk Village Homeowners Association Inc., (UMVHAI) wherein the system composed of three modules namely: Account, Position, and Record

module. The system has three level of access, the administrator that can access the whole system, employee that can only access the employee page which Mapping Directory, Temporary Ticket, Temporary ID & Temporary Card found. Lastly, the user that can only view the homepage of the website.

In order to improve the security of the Homeowners the system has the following modules:

Account module. The module used to create and register new accounts of employee and admin that are found in admin page which can be used to access and to log-in the website. The module has a security login form which consist of username and password to keep-out the intruder to login on the system. The Administrator has the overall management on this module.

Position module. The module has a map directory that would be in giving direction in shortest path, possible to its desired location by clicking or searching the homeowners name on search box. The module also has a vacant lot locator which would only display and view by employee. The admin and employee can access mapping directory.

Record module. The module has two types of record. The 1st type of record is individual homeowners and visitor's data which used to create and generate temporary ticket for vehicle and walk-in visitors. Temporary ID and card is capable to store records such as list of all visitor information who visits the village and can provide a monthly monitoring of visitor which would view and display on admin page. The 2nd type of record is UMVHAI information which used to view the entire information about UMVHAI announcement. The module used to add announcement in admin page which would be displayed on the homepage of UMVHAI website. The administrator has the overall management on this module.

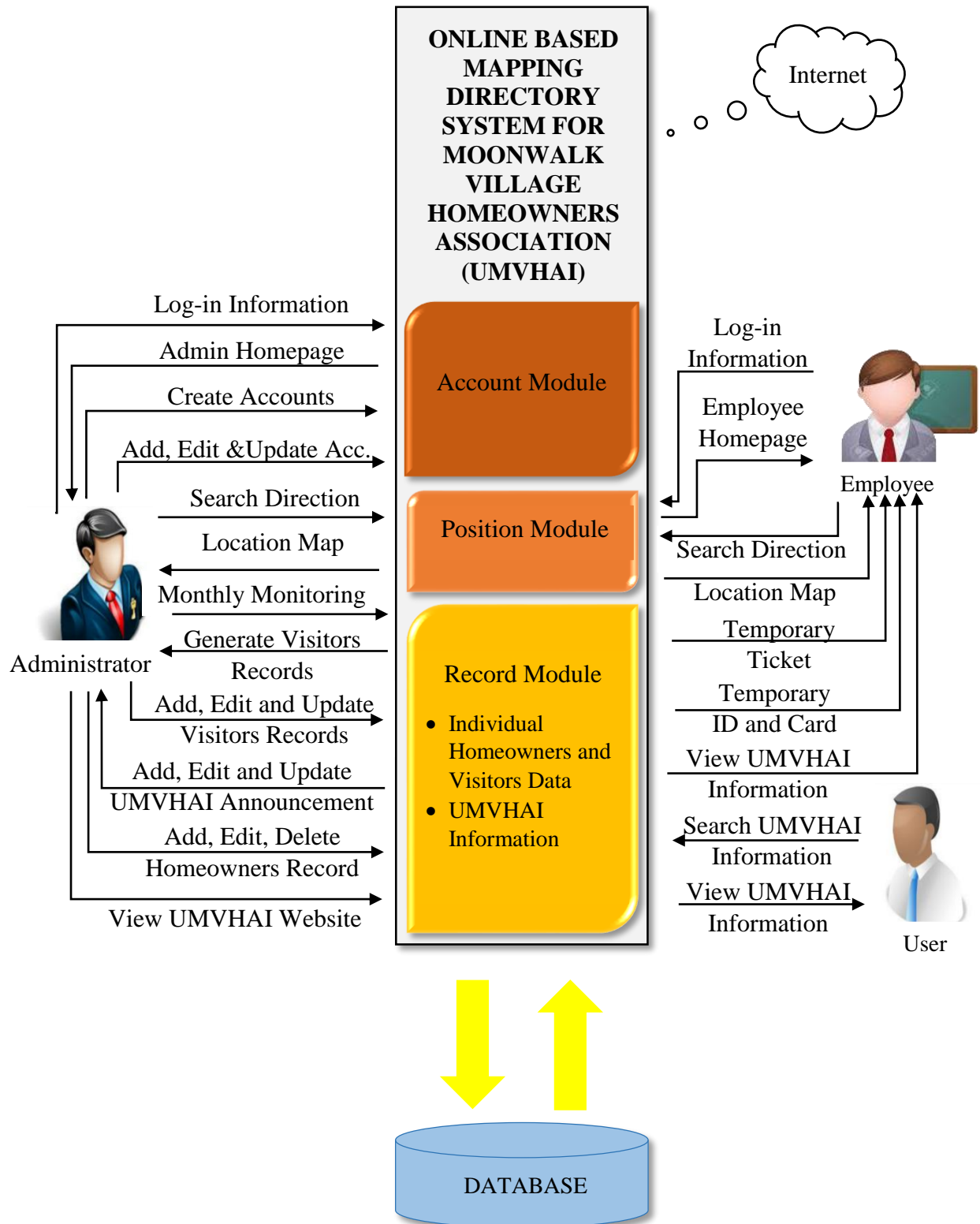


Figure 1. Theoretical Framework of Online Based Mapping Directory System for United Moonwalk Village Homeowners Association Inc., (UMVHAI).

Significance of the Study

The study aimed to give benefits, ideas, contribution, and more convenience to the following by introducing an Online Based Mapping Directory System for United Moonwalk Homeowners Association Inc., (UMVHAI).

Civilian/Visitors. The system would give them convenience in knowing the direction of houses or street.

Guard. The study would profit them in a way that lessens their work in assisting visitor.

Researchers. The study would help the researchers to apply and to gain more knowledge about software development and project management.

Future Researchers. The study would serve as the basis for the future reference. They could also provide the necessary requirements to upgrade or to enhance existing system.

Time and Place of the Study

The Fourth Generation Technique (4GT) model was used for the development of the system. The methodology was divided into four phases. First, the Requirements Gathering which was done during the interview with Mr. Leonardo A. Valencia, the president of UMVHAI in Moonwalk Village, Talon 5, Las Pinas City last May 24, 2018 it was where the Online Based Mapping Directory System was tackled and discussed in front of chairperson and other officers of UMVHAI. Second, the Design Strategy was conducted from June 2018 – March 2019. The third phase was the implementation of 4GT, which happened in March 2019. Lastly, the Testing which was done in March 2019 by using different kinds of testing to find errors and bugs on the system.

Scope and Limitation of the Study

The study of Online Based Mapping Directory System focused on giving direction and to monitor the visitor. The map directory enabled the employee to view a

graphical map. The system was also capable of disseminating information through posting of announcement and events that can be access by guests. The system would only allow the guest user to visit the homepage of the website.

However, the said system also have its own limitation. The Online Based Mapping Directory System would only be located at the guard house that would serve as the starting point of the location map. The employee would be the one who would manage and can use the system of mapping directory, temporary ticket, temporary ID and temporary card.

Tricycles entering the village were not covered by the system since they were already registered in UMVHAI. However the protocol of UMVHAI regarding the in and out of the visitors was still the top priority of the management, hence some of the procedure may not cover by the system itself.

Definition of Terms

The research used technical terms throughout the chapters and to improve the understanding of the study, the definition of operational terms presented below:

4GT. It encompasses a broad array of software tools that have one thing in common, each enabled that the software developers to specify some characteristics of software at high level.

Block and Lot. A method of describing real property that identifies a parcel of land by reference to lot and block numbers within a subdivision, as specified on a recorded subdivision plat.

Data. It is an information in raw or unorganized form (such as alphabets, numbers, or symbols) that refer to, or represent, conditions, ideas, or objects.

Database. It is a collection of information that is organized so that it can easily be accessed, managed, and updated. In one view, databases can be classified according to types of content: bibliographic, full-text, numeric, and images.

Directory. The serving or providing advisory but not compulsory guidance.

Homeowners. A person who owns their own home.

Homepage. It is a webpage that serves as the starting point of web site.

Internet. An electronic communications network that connects computer networks and organizational computer facilities around the world - used with the except when being used attributively

Location. The action or process of placing someone or something in a particular position.

Map. A diagrammatic representation of an area of land or sea showing physical features, cities, roads, etc.

Mapping. It refers to the representation of a certain place.

Methodology. A system of broad principles or rules from which specific methods or procedures may be derived to interpret or solve different problems within

the scope of a particular discipline. Unlike an algorithm, a methodology is not a formula but a set of practices.

Module. One of the features of a project construction

Online. It is a computer or device connected to a network (such as Internet) and ready to use (or be used by) other computers or devices

Researchers. The person who advocates a study, proposal, or project.

System. The term refers to any group of components that interface with and complement one another.

User. One who uses a computer, computer program, or online service.

Visitor. A visitor is someone who is visiting a person or place

Website. A set of interconnected webpages, usually including a homepage, generally located on the same server, and prepared and maintained as collection of information by a person, group, or organization.

W3C. It is an industry consortium which seeks to promote standards for the evolution of the Web and interoperability between WWW products by producing specifications and reference software.

REVIEW OF RELATED LITERATURE

This chapter includes all familiar information that are relevant and similar to the proposed system.

Map

Borneman (2014) stated that maps can be entirely topographically exact or drawn dependent on observations; regardless of what sort of guide it is, considerably more than just area can be gained from every last one. A typical comprehension of a guide is one that is a flat or two dimensional (2D) portrayal of an area. Maps, however, can likewise be there dimensional, for example, a globe or a three dimensional (3D) virtual globe (e.g. Google Earth). Maps can demonstrate an apparent or real connection between articles, locales, or thoughts whether genuine or envisioned. The making of maps all through mankind's history have given specialists awesome knowledge into how extraordinary societies and civic establishments saw their general surroundings dependent on how they made maps and what was delineated on those manifestations.

Mapping

Business Dictionary (2018) stated that mapping is a graphical portrayals of a method, process, structure, or framework that delineates course of action and connections among its distinctive segments, and follows streams of vitality, merchandise, data, materials, x-cash, and work force.

Location Map

Business Map (2018) area maps are particular maps devoted to finding a particular area, demonstrating to go from here to there in the clearest conceivable way. In one sense, an area outline a stripped down rendition of a typical guide in light of the

fact that there is no compelling reason to demonstrate each street in the zone, just the ones prompting the expected goal. Area maps are typically a mix of few maps at various scales to demonstrate to go from the motorway system to nearby avenues. A devoted area delineate a hand crafted outline one objective as a top priority, helping first time guests discover their goal rapidly and effortlessly.

Website

Business Dictionary (2018) virtual location on World Wide Web (WWW) containing a few subject or organization related page's and information records available through a program. Every site has its very own one of a kind web address which can become a web association. The opening page of a site is normally called landing page which contains hyperlinks to different pages on the equivalent or different site(s). A solitary web server may bolster numerous sites and a solitary site may dwell on different web servers, sometime thousands of miles apart.

Website as a related accumulation of internet World Wide Web (WWW) records that incorporates a starting document called a landing page. An organization or an individual advises how to get on the site by giving a location of the landing page.

Homeowners Association

Merlli (2018) mentioned that homeowners association is a composed gathering of property holders inside a specific subdivision, apartment suite or arranged unit advancement. HOA's ordinarily comprise of a governing body that have been chosen by neighbourhood property holders to keep up foreordained standards, directions and principles.

ArcGIS Online

Esri (2018) ArcGIS Online is a cloud-based mapping and examination arrangement. Utilize it to influence maps, to break down information, and to share and

team up. Gain admittance to work process particular applications, maps and information from around the world, and apparatuses for being portable in the field. The information and maps are put away in a safe and private foundation and can be arranged to meet mapping.

My Structured Query Language (MySQL)

Rouse (2013) MySQL is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL). Despite the fact that it can be utilized in an extensive variety of uses, empowers information to be put away and got to over different capacity motors. MySQL was initially created to deal with substantial databases rapidly.

Programming Language

Techopedia (2018) coded dialect utilized by software engineers to compose guidelines that a PC can comprehend to do what the developer or the PC client needs. The most essential called low-level script is the machine dialect that utilized double '1' and '0' code which a PC can run execute quick without utilizing any interpreter or translator program, however is monotonous and complex. The abnormal state dialects, for example, Essential, C, Java are significantly less difficult more 'English-like') to utilize however need to utilize another program a compiler or a mediator to change over the abnormal state code into the machine code, and are in this manner slower.

The programming dialect is a coding languages designed to make a standard type of directions. These directions can be translated into a code comprehended by a machine. Projects are made through programming dialects to control the conduct, and yield of a machine through precise calculations, like the human correspondence process. A programming dialect is otherwise called a programming framework, script or PC framework.

Cascading Style Sheet (CSS)

W3C (2016) CSS is a dialect for portraying for the introduction of the Site pages, including shading, format, and text styles. It enables one to adjust the introduction to various sorts of gadgets, for example, vast screen, little screen, or printers. CSS is free of HTML and can be utilized with any XML-based increase dialect. The division of HTML from CSS makes it less demanding to look after locales, share template crosswise over pages, and tailor pages to various situations. This is alluded to as the partition of structure from introduction.

Hypertext Pre-processor (PHP)

Tech Term (2019) PHP is a HTML-installed Web scripting language. It implies PHP code can be embedded into the HTML of Site page. At that point, when a PHP page is gotten to, the PHP code is perused or "parsed" by the server the page dwells on. The yield from the PHP capacities on the page are normally returned as HTML code, which can be perused by the program. Since the PHP code is changed into HTML before the page is stacked, clients cannot see the PHP code on a page. This make PHP pages sufficiently secure to get to databases and other secure data.

Hypertext Mark-up Language (HTML)

As mentioned by Shannon (2018), HTML is a coding languages conceived to permit site creation. These sites would then be able to be seen by any other individual associated with the web. It is generally simple to learn, with the nuts and bolts being open to the vast majority in one sitting; and very great in what it enables to make. It is always experiencing update and advancement to meet the requests and necessities of the developing web group of onlookers under the course of the W3C (World Wide Web Consortium), the association accused of planning and keeping up the dialect.

JavaScript

Encyclopedia (2016) JavaScript is a programming dialect planned particularly for electronic archives on the internet. Reports on the web are composed in Hypertext Markup Language (HTML). JavaScript programs are installed inside HTML to add dynamic intelligence to web records. JavaScript is proposed to make website page originators a stride past HTML without the intricacy of a full programming dialect. A basic JavaScript program can add intriguing intuitive capacities to a page. JavaScript is additionally appropriate for the improvement of substantial and expand UI's in web archives. Great programming aptitudes are important to ace it, and complex apparatuses are getting to be accessible for JavaScript improvement.

jQuery

Term Terms (2018) jQuery is a JavaScript library that permits web designers to add additional usefulness to their sites. It is open source and given to free under the MIT permit. Lately, jQuery has turned into the most prevalent JavaScript library utilized in web advancement.

Database Management System

Rouse (2018) database is an accumulation of data that is composed so it may be effectively gotten to, oversaw and refreshed. Databases process remaining tasks at hand to make and refresh themselves, questioning the information they contain and running applications against it. In one view, databases can be characterized by substance compose: bibliographic, full content, numeric and pictures.

XAMPP

As eloquently stated by Cherran (2011) XAMPP is an open-source web server bundle that takes a shot at different stages. It is really an acronym with X signifying "cross" stage, A for Apache HTTP server, M for MySQL, P for PHP, and P for Perl.

XAMPP intended to help website page engineers, software engineers, and fashioners check and survey their work utilizing their PCs even without association with the web or web. In this way, essentially XAMPP might be utilized to remain as pages for the web even without association with it. It can likewise be utilized to make and arrange with databases written in MySQL and additionally SQLite. Besides being cross-stage, XAMPP is additionally a freeware.

Directory in the Philippines

iLink (2009) the Directory in the Philippines that covers a wide list including hospital directory in the Philippines to directory of doctors in the Philippines with more information than the traditional yellow pages, all in one website. Invite everyone with Philippine-based businesses, establishments and professional service providers to submit and/or advertise their info and Directory in the Philippines to make it easier for people to find them. Directory in the Philippines aims to list all businesses, services, professionals, websites, people and places of interest all over the Philippines. Directory in the Philippines gives access to information right at fingertips for school listings, medical schools, newspapers, internet travel information, churches, zip codes, diving locations and Philippine companies. Ilink.ph is designed to be one-stop destination for anything can think of that is about or related to the Philippines. The Internet is an overwhelming space and finding the information that need can be a frustrating and time-consuming process. Mission is to be the leading directory in the Philippines providing quality e-business, advertising and information services. Hospital directory in the Philippines and directory of schools in the Philippines and real estate companies are all in Ilink.ph.

Topographic Mapping System

DOST (2018) the READY Project Hazard Maps. The READY Project is a collaborative effort of the Government of the Republic of the Philippines, the United Nations Development Program (UNDP) and the Government of Australia Australian Aid (AusAID).

It aims to address the problem of disaster risk management at the local level by empowering the most vulnerable municipalities and cities in the country and enable them to undertake disaster risk management. The project hopes to develop a systematic approach to community based disaster risk management in 27 identified high risk Philippine provinces.

The Office of Civil Defense (OCD) is the executing agency of the project while the collaborating National Disaster Coordinating Council (NDCC) agencies are the Mines and Geosciences Bureau (MGB), the National Mapping and Resource Information Authority (NAMRIA), the Philippines Institute of Volcanology and Seismology (PHIVOLCS-DOST), and the Philippine Atmospheric, Geophysical, Astronomical and Services Administration.

Land Mapping System to be used in Marawi

Department of Environment and Natural Resources (2018) DENR will be making use of a modern land mapping system to sustain order in the war-ravaged Marawi City. Environment and Natural Resources Secretary Roy Cimatu (DOT / MANILA BULLETIN)

DENR Secretary Roy Cimatu said the geographic information system (GIS) land mapping and information system will help “identify, establish, integrate, reconcile and re-establish existing technical and physical land boundaries.”

“Properties in both private and public land, formal and informal settlement descriptions and delineations in the most affected areas and other surrounding areas of Marawi City will also be included in the land mapping to collect information,” Cimatu

said. The GIS is designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. Utilizing the GIS-based land mapping and information system is in line with the DENR being designated as the agency in charge of the newly created land conflict management unit of Task Force Bangon Marawi's Sub-committee on Land Resources Management (SLRM). "Both our goal and strategy is 'Sustaining Peace and Achieving Sustainable Development Goals through Environmental Peace building'—these are the DENR's inputs to the Bangon Marawi Comprehensive Recovery and Rehabilitation Program," Cimatú explained.

Mapping the Philippines Mangrove Forest Using Landsat Imagery

As studied by Long and Giri (2011), the current, accurate, and reliable information on the areal extent and spatial distribution of mangrove forests in the Philippines is limited. Previous estimates of mangrove extent do not illustrate the spatial distribution for the entire country. This study, part of a global assessment of mangrove dynamics, mapped the spatial distribution and areal extent of the Philippines' mangroves circa 2000. The publicly available Landsat data acquired primarily from the Global Land Survey to map the total extent and spatial distribution. ISODATA clustering, an unsupervised classification technique was applied to 61 Landsat images. Statistical analysis indicates the total area of mangrove forest cover was approximately 256,185 hectares circa 2000 with overall classification accuracy of 96.6% and a kappa coefficient of 0.926. These results differ substantially from most recent estimates of mangrove area in the Philippines. The results of this study may assist the decision making processes for rehabilitation and conservation efforts that are currently needed to protect and restore the Philippines' degraded mangrove forests.

Improving Mapping Capability in the Philippines

The National Mapping and Resource Information Authority (NAMRIA) maintains the Philippine Geodetic Reference System (PGRS) – the primary reference for all surveying and mapping in the country. In line with its modernisation plans, it asked Ordnance Survey International to optimise the performance and value of its Philippine Active Geodetic Network (PageNET), the country's network of permanently installed and continuously operating geodetic reference stations (CORS).

Kiosk Transports Shoppers on a Philippine Adventure

As mentioned by Hall (2014), physical action and participation adds to the engagement and involvement in what one sees, and that so the Philippines Tourism Board is hoping for with a traveling digital signage kiosk that lets people see — and interact with — the natural beauty offered in the island country.

The Philippines Tourism Board's "It's More Fun in the Philippines" kiosk is intended to "send a message that the destination is back and ready for tourists," according to an announcement from kiosk designer Pearl Media. The digital signage kiosk invite travellers to explore the Philippines via interactive adventures, and it also showcases street scenes, beaches and towns from the Philippines.

Visitors who "travel" at the kiosk also can be entered into a sweepstakes to win an iPad, one per market. They would also receive an action photo/postcard of their experience as a souvenir. The photo can be shared instantly on the visitor's social media profiles as well as on the Philippines Tourism board website.

"Immersive kiosks are an entertaining way to communicate the brand message that the Philippines is a destination worth considering," Pearl Media CEO Josh Cohen said in the announcement. "The designed this experience to provide potential travelers with the opportunity to explore unique attractions/destinations within the Philippines and create a memorable experience that could influence their vacation plans."

The Pearl Media team created, built and installed the interactive kiosk that is activated through gesture-based technology. As consumers step up to the branded station, they would see HD content of attractions in the Philippines. The virtual travellers would be prompted to take their Philippines adventure by either rock climbing or scuba diving. The adventure ends when their photo is snapped and superimposed into the scenery to create a postcard. The traveller can then retrieve their "postcard" on their phone and share it with friends, according to the announcement.

Mapping Philippine Vulnerability to Environmental Disasters

The aim of this project, Mapping Philippine Vulnerability to Environmental Disasters is to identify areas in the country that are at high vulnerability and risk to environmental disasters. Environmental disasters refer to the collective impacts of damaging events on surroundings. Hazards and disasters are mapped and analyzed via geographic information systems (GIS), environmental modeling tools and resulting spatial databases.

The maps, when properly disseminated, form important policy and decision tools towards better disaster management and adaptation in the country. It is recommended that composite vulnerability and risk indices using the GIS approach be further developed, that is, by and across categories of factors. This is aimed at improving national and local assessment. Results may then guide and strengthen capacity building in disaster preparedness and management. The aim of this project, Mapping Philippine Vulnerability to Environmental Disasters, is to identify areas in the country that are at high vulnerability and risk to environmental disasters. Environmental disasters refer to the collective impacts of damaging events on our surroundings. Hazards and disasters are mapped and analyzed via geographic information systems (GIS), environmental modeling tools and resulting spatial databases.

The maps, when properly disseminated, form important policy and decision tools towards better disaster management and adaptation in the country. It is recommended that composite vulnerability and risk indices using the GIS approach be further developed, that is, by and across categories of factors. This is aimed at improving national and local assessment. Results may then guide and strengthen capacity building in disaster preparedness and management.

Palawan Benefits from DOST's Flood Hazard Mapping Project

Fabro (2015) mentioned that the Puerto Princesa (CNN Philippines) - Palawan is one of the many provinces that benefited from the Department of Science and Technology's (DOST) flood hazard mapping project.

On Monday (August 17), the DOST, under its Disaster Risk and Exposure Assessment for Mitigation (DREAM) project, turned over the copy of the province's digital terrain model, digital surface model and orthophotograph to the Palawan and Puerto Princesa government.

Dr. Enrico C. Paringit, program leader of the University of the Philippines' (UP) DREAM program, the said topographic maps would be used in flood modeling of disaster-risk prone areas in Palawan.

Paringit said the project targeted to cover 22 critical river basins across the province. In fact, since they started late May 2015, they completely assessed 10 river basins as follows: Babuyan, Bacungan, Candawaga, Iraan, Ilog, Iwahig, Panitian, Malatgao, Lamacan and Canipan.

Aside from disaster management, Paringit said that local government units (LGU) can also use the map in creating its comprehensive land use plan and comprehensive development plan.

VSU Turns over Flood Hazard, Resource Maps to Eastern Visayas Towns

As stated by Sarimiento (2017), LEYTE, Philippines — every year, more than 20 typhoons visit the country, making the communities susceptible to hazards like flooding. Beyond the damage, this poses to the country's agricultural resources. It also makes lives at risk due to these hazards.

With this challenge in mind, a research team from the Visayas State University (VSU) in Baybay City, Leyte produced hazard and resource maps for about 40 municipalities and cities from the provinces of Leyte, Southern Leyte, Samar, Eastern Samar, and Northern Samar.

On May 26, VSU Phil-LiDAR 1 and 2 projects turned over high resolution maps, and data in CDs to representatives of local government units in the 5 provinces of Region 8 after 3 years of research.

The flood hazard maps, produced by Phil-LiDAR 1, contain information on predicted flood depth and risk levels in areas close to river basins. On the other hand, the resource maps, produced by Phil-LiDAR 2, reflect the agricultural, forestry, coastal resources of a municipality or city, as well as potential renewable energy sources, and hydrologic data.

Philippine Hazard Maps Online

Hazard maps produced under the READY Project and other recent efforts to map hazards in the country MANILA, Philippines - Rappler, through Project Agos, is working with government agencies in order to make the maps produced under various hazard mapping projects more accessible to the public.

In July 2014, Rappler signed a memorandum with the Philippine Institute of Volcanology and Seismology (PHILVOCS) to combine efforts in communicating critical scientific information on hazards and risks to the general public. As part of the agreement, PHILVOCS agreed to share data on geohazards with Rappler, including

hazard and risk maps, for dissemination to the public via the Project Agos Disaster Information platform.

Rappler agreed to use the data shared by PHILVOCS to produce and publish content that would help explain and increase the public's understanding of geohazards and risks associated with those hazards. Rappler also agreed to consult Phivolcs regarding the proper interpretation and display of the scientific data to avoid misinterpretation.

Yolanda a year after: Few LGUs asking for Multi-Hazard Maps

Ranada (2014) mentioned that it is possible for other LGUs to have already gotten access to the maps and other data from these agencies, said Fabila.

But LGUs with their own copies of the maps would ensure the scientific data is used for localized rehabilitation efforts. The center collates all the maps created by government agencies like DOST's Project NOAH, PAGASA, PHILVOCS, and the DENR's Mines and Geosciences Bureau (MGB) so that those doing recovery work can get all the data they need to plan out their rehabilitation. Multi-hazard maps and flood hazard maps are just some of the data available through YORINFO Center.

Multi-hazard maps identify the vulnerabilities of LGUs to threats like landslide, flooding, sea level rise and storm surge. Flood hazard maps identify specific areas in LGUs near river systems that may be inundated by varying amounts of rainfall. These maps can go down to the barangay (village) level, pinpointing exactly which areas are most exposed to these hazards and which are the safest.

Google Launches Filipino-Made Google Maps

Google Inc. has just announced the launch of more accurate and updated maps of the Philippines, courtesy of the tireless efforts of hundreds of Filipinos who helped

edit details of the country's locations on Google Map Maker. An application that allows users to edit Google Maps data online.

The application was launched in the Philippines in October 2008, which garnered tens of thousands of edits from Filipinos coming from all professions including civil engineers, business executives, programmers, entrepreneurs, and students. The users helped edit roads, streets, landmarks, and even business establishment locations nationwide.

Google Maps is a free web-mapping service application and technology provided by Google that powers many map-based services. Users need to sign up for a Google account in order to access Google Map Maker which allows users to contribute not just names of locations, but attributes, reviews, major event notices, and even road speeds at a particular street. Users can also become moderators and fact-checkers in particular neighbourhoods. More than just helping people navigate, some users said editing the Philippines on Google Maps is also a way of promoting the country.

Global Positioning Service (GPS) in the Philippines

As studied by Damiles (2011), in order for a GPS to work faster, it needs 2 to 3 satellites that give out GPS signal. In the Philippines, there is only 1 satellite for GPS, according to researched, it is called AGILA2. It is not quite clear if the GPS system here in country is accurate or not. I guess it depends on GPRS receivers/devices. The Garmin GPS III plus (old model) is said to be accurate in terms of street locations.

The said devices are commonly used by cars to navigate the country with the help of this device. This device would help reach the destination faster because of its function that can compute the shortest way to your destination. The newer models of the said devices are now equipped with voice prompt. It means that while driving, there would be a voice that would help you by instructing when and where would turn.

Image Processing and GIS for Hydrothermal alteration Mapping, Baguio District, Philippines

Carranza and Hale (2018) stated that a technique to map hydrothermally altered zones that involves processing of Landsat TM images and integration of ground data is tested in the Baguio district of the Philippines. Two band ratio images are input into principal components (PC) analysis to map each alteration mineral into separate PC 'mineral images'. Digitized ground data are used for training pixels for the known alteration zones, urban and water areas. The PC mineral images, a digital elevation model (DEM) of the test area and the training pixels are used in a supervised classification to map hydrothermally altered zones. The known hydrothermally altered zones are clearly mapped in the classified image.

PNP Incorporates GIS-based Crime Mapping Tool

Philippines: The Cordillera police director, Chief Superintendent Benjamin B. Magalong developed a GIS-based tool for more accurate crime analysis and internal security operation. The tool for crime-mapping and tracking criminals and other threat groups has been developed with the assistance and support of civilian engineers and students from different colleges and universities in the region. In a report to Philippine National Police (PNP) Chief, Director General Nicanor A. Bartolome, Magalong said the 'E-Blotter' and 'Mobile Tracking System of Patrol Vehicles' in the region are also incorporated in the GIS project to further improve the police's response time on any incident. With the help of this new system, local patrol vehicles can be monitored for easier dispatch in any incident, accident or disaster-hit areas, Magalong added.

The Cordillera police director said the 'Buddy System' is also being strictly observed in the implementation of the police integrated patrol system in the region. Under the programme, at least two uniformed police officers patrol in tandem to provide much-needed police visibility as a deterrent to the commission of crime.

Related Foreign Studies

Designing and Evaluating a UI for Helping Users Uncover and Create Missing Road Segments on a Geo-wiki. As stated by Liu (2013), incomplete map data is a persistent problem in map applications, especially those that provide route-finding services. In order to solve this problem, map matching algorithms that take advantage of GPS traces to detect missing map data are emerging and developing quickly in recent years. A number of applications have used this technique to update and repair maps.

Cyclopath is a geo-wiki system designed for cyclists that has been deployed in the Twin Cities in Minnesota for five years. In addition to being a collaboratively edited geographic system, it is also a computational system that computes bike friendly routes for cyclists. Like other map applications, it has suffered from the problem of incomplete map data, resulting in that users are not getting the best bike routes.

The study was related in system in manner way that the study used algorithms for the best bike routes for cyclists like in Online Based Mapping Directory that used algorithms to direct visitors in shortest pathway into chosen place. Both study is web-based mapping application.

E-Gatepass System. The study developed by Lengre *et al.* (2018), mentioned that the objective and scope of the Project E-Gate pass system (Redpass application) is to record the details and various activities of the user. It simplified the task and reduces the paperwork. In this project, they were reducing the paperwork which is done by giving the paper gate pass. The providing the electronic version of the paper gate pass. The provided appropriate training to the user which suit their specific needs. Specific support has been provided at key points within the academic calendar. Admin is monitoring all the user and system. In this project, the only faculty is approving the user E-gate application if they want to allow student then gate pass system is a popup on the guard system database. Training has been provided timely basis and they got

trained as the E-Gate pass System is new and rolled out to their area of responsibility. At the moment in the very early stages, so it is difficult to put a specific time on the training, but will keep people informed as plans are developed. The system is very user-friendly and it is anticipated that functions of the system are easily accessed by administrators, faculties, students, and applicants.

The study was proportional in a style that the objective of the study was to develop E-Gatepass System to upgrade the existing system by increasing its efficiency and effectiveness by reducing the manual work. Like in Online Mapping Directory System, the temporary ID and temporary Card was develop to solve the manual process of visitor by login on the logbook. Both system has administrator to manage and to monitor all user or guest.

Navigation and Mapping through Automated Image Understanding and Retrieval. As state by Valluri (2009), mentioned that a novel method for image retrieval of navigational data through automated image understanding is presented, for mapping purposes. The method discussed involves two steps, an (a) offline process and an (b) online process. In the offline process, the database of images would be clustered roughly into groups based on their colour his pictograms using the LSH algorithm. Further, the images are processed using the graph based visual saliency method to highlight the regions with colour and as a result a reduction of (62.3%) is achieved in the number of SIFT features in the next step. SIFT features are extracted from these resulting images. In the online process, a query image is provided and is assigned to one of the groups created in the offline process based on a distance measure. The employ the use of SIFT features, opponnent colour space in feature extraction. In feature matching, the make use of histogram intersection score filter and a robust matching procedure proposed by Lowe. The compare methods to many state of the art algorithms in logo detection and object recognition. The method does not assume apriority knowledge of the candidate logos in the database. The state that the

image database is logo-rich and we set out to find any image that is presented to the retrieval system. Experimental results confirm that our methods perform at least (25%) better than Lowe's object recognition algorithm and that our methods are robust to changes in scale, illumination and angle of rotation.

The study was linked in style that the objectives of the study was to develop an image retrieval system for a large database of street level images, such that, given a query image, the system can retrieve images containing the information present in the query image. Like in mapping directory system, the main purpose of Temporary ID and Temporary Card is to save and store images in database.

Incorporating Social Spatial Data in Sustainable Management: Mapping Tourism-Recreational Activities of Locals and Tourists in Hood Canal, Washington using ArcGIS. Based on the study of Hanein (2014), the Hood Canal watershed is a saltwater fjord that provides sample and diverse opportunities for tourism and recreational activities such as camping, boating, shell fishing, swimming, and hiking.

The current tourism literature does not have a strong focus on local recreation trends and whether locals partake in different recreational activities than tourists who visit the same region. In order to address this gap, the collected and analyzed social spatial data using an online map survey to understand the activities of Hood Canal locals and people who visit the region. In SEAM, an online tool was used to test if this method is useful in gathering spatial data. The survey asked various demographic questions and perception questions about the health of the Hood Canal and the impact of tourism-recreational activities. On the actual map, participants drew polygons, lines or points to represent locations of where they enjoy tourism/recreational activities. The recorded the data into seven larger categories and analyzed using ArcGIS and a Pearson test. Non-motorized shore activities accounted for the most activities done in Hood Canal. Results show there are differences among the types of activities locals and tourists

participated in as well as in their perception of how their activities impacted the overall health of the Hood Canal. In SEAM was effective in collecting data stored in GIS format and removed the need to digitize paper maps or convert them into GIS formats. It provided a simple way to engage stakeholders by allowing them to complete the survey at their convenience. To make the tool more effective, educational information about mapping should be sent out to users beforehand. The results provide tourism brokers, local residents, tourists and managers with visual representations of how the watershed is being used for recreation and tourism purposes by locals and by tourists.

The study of Adi Hanein was connected to the study of Online Based Mapping Directory System in a way that the study used ArcGIS as map of the system. Both system is a Geographical Information System (GIS).

Online Map Application Tracking Vehicles and Personnel. The study was developed by Padam (2011), the objectives of the bachelor's thesis was to analyze, design and implement an online map application so that the customer can track vehicles and personnel in working field via web browsers, which is the product of IMSS Ltd. Oy Ab.

The main objective of this project was to develop a cost effective web based application to track vehicles of the taxi company through receiving GPS data from the vehicles. Despite the fact that the application could be developed by using Google Map API/Bing Map API/ Open Street Map API (open source), the application is developed without using any third party APIs. The paid Map APIs such as Google and Bing are quite expensive and hence not appropriate for this project. Since the source code of the application contains confidentiality, it cannot be made available for public in the future. The use of Open Source Map API such as Open Street also does not seem to be a right choice.

The study was proportional in a style that the objective of the study was to develop web-based application for tracking vehicles and personnel like in system

objective was to develop an online based for homeowners of the village. The study used PHP and HTML code for embedding the applet.

Map-Based IOS Application Development using ArcGIS Runtime SDK. As studied by Belyavskiy (2015) indicated that the aim of this bachelor's thesis was to get familiar with the process of development of a map-based mobile phone application for IOS and to create a solution to a real life demand.

Nowadays, modern gadgets play an important role in our everyday life. There are hundreds of applications available on application stores for different operating systems. This allows using these gadgets for varieties of different purposes. One the most interesting and rapidly developed trends in mobile application development is related to maps. Such features, as tracking location, navigation and location sharing combined with gadgets' portability and high productivity improve our lives. This study is about creating such application for a certain target audience – for Fishermen, who visit or live in Finland. Its main function is to show user's location on maps and to help him/her with catching fish by finding depth differences of the lakes' or rivers' bottoms. Such differences are places, where fish prefers to stay. This application was created using ArcGIS product line and iOS development tools.

The study developed by Ilya Belyavskiy was connected to the system in manner that the study used ArcGIS Framework as a core of the project and ArcGIS Online for map of the study. The study used same basic software like in Online Based Mapping Directory System which used Sublime Text 2 as code editor and Adobe Photoshop CS6 for image editor.

Web-Based Student Information Management System The student Information Management System (SIMS) provides a simple interface for maintenance of student information. It can be used by educational institutes or colleges to maintain the records of students easily. The creation and management of accurate, up-to-date

information regarding a students' academic career is critically important in the university as well as colleges. Student information system deals with all kind of student details, academic related reports, college details, course details, curriculum, batch details, placement details and other resource related details too. It tracks all the details of a student from the day one to the end of the course which can be used for all reporting purpose, tracking of attendance, progress in the course, completed semesters, years, coming semester year curriculum details, exam details, project or any other assignment details, final exam result and all these will be available through a secure, online interface embedded in the college's website. It would also have faculty details, batch execution details, students' details in all aspects, the various academic notifications to the staff and students updated by the college administration. It also facilitates explore all the activities happening in the college, Different reports and queries can be generated based on vast options related to students, batch, course, faculty, exams, semesters, certification and even for the entire college (Bharamagoudar *et al.* 2013).

The study was linked to the system because of the Web Based SIMS objective was to provid the online interface for students, faculty etc. and increasing the efficiency of college record management. Like in Online Based Mapping Directory System objective was to disseminate information about UMVHAI through online website and to develop an inventory or record data for every visitor in village. Both system has administrator for managing the whole system. Lastly, both system has a same programming language used like HTML, CSS, JavaScript, PHP, and SQL.

A Web-Based Content Management System. The information for a department of a university on a website tends to be general in nature and often unchanging. If the department or the faculty wish to change, add to, or personalize this information, they need to request the website administrators to make this change on their behalf. This process besides being time consuming is inefficient and may not

address the needs of the department accurately. This thesis addresses the issue by the development of a web based content management system. This system provides a simple user friendly interface where the faculty can enter/maintain their personal information, manage information on their classes, upload images, send emails to students registered in a class and interact with students on a discussion board for each class. This web system was designed to be used by the department of Africana Studies at San Diego State University, but with minor changes, it can be used by any department of any university Rameshbhai (2011).

The study was proportional to the system in manner way that both system used HTML, PHP and CSS for the developing of system. Both system had the same features when it comes on ease of use because of both system was designed to be user friendly, very intuitive, informative and also both system were browser compability which designed and implemented so that it is compatible with different browsers.

Web-Based Document Management Systems in the Construction Industry. Wong (2012), in Hong Kong, there are a lot of international architectural and engineering consultant firms whom are working on projects world wide. Contractors, due to the relatively small scale of the local Hong Kong construction industry, are also working on a lot of international projects, i.e. Macau, China, Middle East, Malaysia, India, Vietnam, etc. When Hong Kong construction industry practitioners are answering the questionnaire or being interviewed on their perspectives on these electronic document management systems, their opinion are based on the projects they have worked on or working on. These projects range from small scale fitout projects situation locally in Hong Kong as well as international projects situated outside Hong Kong involving multi-national project team members situated all over the world. The study was therefore aimed to review the perspectives of construction practitioners as a whole rather than a project by project case study.

In view of the different research studies conducted by various parties, the study would investigate the current usage of web-based electronic document management system by the Hong Kong construction practitioners and the overall comments for those who used these systems as well as the perception from those who have never used these systems. The study aimed to review the benefits of the implementation of these web-based document management systems and shortfall of as viewed by construction practitioners in Hong Kong. Based on their experience, the study would formulate possible suggestions for the future in the implementation as well as how the construction industry may improve in their communication in the future.

The study was related on the study because of the study objective was to investigate the benefits, obstacles and acceptance of web-based document management system. Like in Online Based Mapping Directory System objective was to give benefits the homeowners, visitors and moonwalk Village. Both system used same programming language for developing the system.

A Web-Based Information System for a Regional Public Mental Healthcare Service Network in Brazil. The regional networking between services that provide mental health care in Brazil's decentralized public health system is challenging, partly due to the simultaneous existence of services managed by municipal and state authorities and a lack of efficient and transparent mechanisms for continuous and updated communication between them. Since 2011, the Ribeirao Preto Medical School and the XIII Regional Health Department of the Sao Paulo state, Brazil, have been developing and implementing a web-based information system to facilitate an integrated care throughout a public regional mental health care network.

After a profound on site analysis, the structure of the network was identified and a web based information system for psychiatric admissions and discharges was developed and implemented using a socio technical approach. An information technology team liaised with mental health professionals, health service managers,

municipal and state health secretariats and judicial authorities. Primary care, specialized community services, general emergency and psychiatric wards services, that comprise the regional mental healthcare network, were identified and the system flow was delineated. The web based system overcame the fragmentation of the healthcare system and addressed service specific needs, enabling: detailed patient information sharing; active coordination of the processes of psychiatric admissions and discharges; real time monitoring; the patients' status reports; the evaluation of the performance of each service and the whole network (Yoshiura *et al.* 2018).

The study was connected to the system in manner way that the objective was to develop a Web Based Information System to give benefits the Regional Public Mental Healthcare of Brazil. Like in system that the objective was to develop Online Based Mapping Directory System to give benefits the homeowners, visitors and moonwalk village. Both system used PHP, HTML and CSS for the develop of Web-Based. Lastly, MySQL used as the database of the system.

Web-Based Project Management System. As studied by Aadamsoo (2010), to increase an efficiency of a product, nowadays many web development companies are using different project management systems. A company may run a number of projects at a time, and requires input from a number of individuals, or teams for a multi level development plan, whereby a good project management system is needed. Project management systems represent a rapidly growing technology in IT industry. As the number of users, who utilize project management applications continues to grow, web based project management systems enter a critical role in a multitude of companies. Thus, a proper project management system plays a distinctive part in ensuring reliable, robust and high quality web applications for customers. Developing a web based project management system and showing how, in turns, it helps users to handle projects. These processes in everyday's working life, is the scope of the thesis. The reliability and robustness of a web based project management system has also

been set as the structure of the current thesis. Finally, a web based project management system has been developed, which highly meets the standards and requirements set by the company. The web based project management system uses an already integrated TRAC application that has improved to suite companies needs.

The study was linked to the system in manner that the programming language was used for the develop of Web-Based was PHP and HTML. The objective of Web Based Project Management was to store project information. Like in Online Based Mapping Diretory System was develop to manage visitor in village, map directory of village and for security of homeowners.

A Web-based Appointment System to Reduce Waiting for Outpatients: A Retrospective Study. The long waiting times for registration to see a doctor is problematic in China, especially in tertiary hospitals. To address this issue, a web-based appointment system was developed for the Xijing hospital. The aim of this study was to investigate the efficacy of the web-based appointment system in the registration service for outpatients.

Data from the web-based appointment system in Xijing hospital from January to December 2010 were collected using a stratified random sampling method, from which participants were randomly selected for a telephone interview asking for detailed information on using the system. Patients who registered through registration windows were randomly selected as a comparison group, and completed a questionnaire on-site.

The system was proportional in the system because of the web-based appointment system could significantly increase patient's satisfaction with registration and reduce total waiting time effectively. Like in Online Based Mapping Directory System that reduce the manually work of guard when it comes on security. The visitor's satisfaction of finding houses location in village will be reduce the time consuming (Cao *et al.* 2011).

Student User Satisfaction with Web-based Information System in Korea Universities. As studied by Kim (2010), in his study revealed that despite of the rapid adoption of computer-based information systems in higher education in Korea and their increased importance both in education/research activities and administration, there have been few studies on whether these campus-wide information system (CWIS) are being effectively used from the student user' point of view. This study tests a modified model developed for this study based on previous literatures to measure student user satisfaction of the information systems. It was found that information and system satisfaction significantly affected the overall user satisfaction with CWIS.

The system of Won Kim was related on the system because the objective of the system was to analyze the student user satisfaction of campus-wide information system (CWIS) in Korean universities. Like in Online Based Mapping Directory System to analyze the visitor satisfaction when it comes on visiting in village and also both system was a web-based.

Related Local Studies

Information Kiosk with 3D mapping of Bacoar Government Center. The system developed by Caluracan and De Leon (2017), benefited the City hall and the visitor of Bacoar Government Center through the system of Information Kiosk with 3D Mapping. The system provides functionality that would allow the visitors to navigate the places in short path way inside the city hall. The system also provides the account for administrator to manage the reliability of the system and update the announcements and to change the offices.

The study was also connected to the system in a style that the objectives of both system served as a map directory of the company that helped visitors to direct into chosen place and to familiarize them. Both system also generated information such as list of visitor information and have an administrator account to manage all

functions of the system. Lastly, both system used Fourth Generation Technique (4GT) methodology.

Information System and Kiosk Directory of Southeast Asian Medical Center. As stated by Balansag *et al.* (2016), the study was conducted to develop an Information System and Kiosk Directory of SAMC. It was developed for the benefit of the users of client of the said institution. The system enables the users and visitors to be familiarized of the entire organization. It functions as a map, directory, schedule checker of the doctors assigned on that day and information about the hospital. The system's accessibility was divided into two sections. The first section was the administration section, who was responsible in manipulating the business inside the system and the other was the user section who allowed to search and view only.

Fourth Generation Technique was used as the development pattern of the system. It was composed of four different levels: requirements gathering, design specification; and coding, implementation and testing.

The system was developed through the use of different development tools; Microsoft Visual Basic.Net as the major programming language used. Adobe Photoshop CS3 for better interface design and animation, Microsoft SQL Server 2008 as the major database. Information System and Kiosk Directory was integrated with touch – screen for better client's accessibility.

The study was proportional in a way that the both system used 4GT as a methodology having the same four phases. Both system used Adobe Photoshop for designing and animation of the GUI. The information system and kiosk directory have mapping directory that can find the rooms of user wanted to locate. The study also had an administrator which responsible for adding, editing, deleting and updating data.

Nusugbu Malunggay Information and Mapping System. The study revealed that in modern age technology, people are interested in an eye-catching website,

information systems, mapping system, etc. It gives more meaning to people when it comes to technology.

The programming language used in the study was PHP, HTML, CSS and Google Map API for the mapping system and MySQL in managing the database. The study have three users; the admin, viewer, and feeder. The feeder would feed additional moringa information to the map that the admin would confirm and at the same time the admin can be a feeder (Salac *et al.* 2014).

The study was proportional in the system because the both system used Hypertext Pre-processor (HTML), Hypertext Mark-up Language (HTML) as programming language and Cascading Style Sheet (CSS) for the design. Lastly, both system was a Geographical Information System (GIS).

Development of Homeowners Association Website for Gardenia Valley.

As indicated by Laureano & Pedron (2013), indicated that benefited the Homeowners Association of Gardenia Valley through the developed of Homeowners Association Website. The system gives functionality that would allow homeowner to have an easy access with their monthly dues and water bill records through online viewing of their current outstanding balance. The system also provided an account for every homeowner and for the administrator who is one of the association staff of Gardenia Valley for managing the records, pictures and announcements.

The system was developed through the use of various development tools. Adobe Dreamweaver CS5, Adobe Photoshop CS5 and Adobe Flash Professional for the design of the system, PHP as the scripting language, JavaScript for the client side coding, MySQL 5.0.21 as the data storage of the system and Apache as the server.

The system of Laureano and Pedron was linked in a style that both system used PHP as the scripting language and JavaScript for the client side coding. The aimed and objectives of the system was to develop Homeowners Association Website like in Online Mapping Directory System for Homeowners Association to develop an

Online Website. Both system used W3C (World Wide Web Consortium) to evaluate the performance of the system.

Online Cemetery Management of Heavenly Peace Memorial Garden. As stated by Lorenzo & Senorin (2016), stated that the study was conducted to develop Online Cemetery Management of Heavenly Peace Memorial Garden. The said cemetery uses manual system in retrieving missing graves and by disseminating information of the availability of lots. The website provides direction for the graves that are missing and it also provides information about the ability of lots and promos.

Online Cemetery Management of Heavenly Peace Memorial Garden used Fourth Generation Technology (4GT) served as methodology of the study. The 4GT has four phases: Requirements Gathering, Design Strategy, and Implementation of 4GT and Product.

The study was proportional to the system in a way that the main objectives of both system was to develop an online based. The said system has a mapping directory that provide direction into empty graves like mapping directory system that provide direction into chosen house or street. Both system has same methodology which is Fourth Generation Technology (4GT).

Online Grade Management System of Cavite State University Bacoar City Campus. As stated by Arguellas and Loriezo (2018), stated that the study was conducted to develop a student portal for Cavite State University- Bacoar City Campus. The software was developed for the benefits of the said university students and faculties. The system helps the university to promote their university online. This also helps the student of Cavite State University – Bacoar City Campus to view their grades online.

The Agile Methodology was used as the development of the software. It has five phases: the requirement analysis, planning, designing, development, and testing phase.

The system was developed through the use of various development tools. PHP 7.1 as the programming language, MySQL 5.6.25 as the data storage of the system, Apache 2.4.29 as the server and CSS, and Adobe Photoshop CS6 for the system design.

The Online Grade Management System of Cavite State University - Bacoor City Campus was related to the study because of the same programming language, data storage and server. Also, the study has administrator account to control and access all of the function of system. Online Grade Management System was web-based or web application like in mapping directory system.

Online Ticket Reservation System with Mapping of Interisland Airlines.

As studied by Alonzo and Gianan (2016), indicated that the study was conducted to develop an Online Ticket Reservation System with Mapping of Interisland Airlines. The software was developed for the benefits of the owner of the airlines and customer who can view the website. The system provides functionality that would allow the customer to fill out form thru online reservation. The system also provides the account for administrator to manage the reservation and updated the content of information.

The software requirements for building the system were Adobe Photoshop for the graphical user interface, CSS and HTML for the design of the system, PHP programming language and JavaScript as the scripting language, Sublime text for editing code, MySQL as the data storage of the system. Microsoft Office Word was used for the documentation of the study and XAMPP were used to have an ease installation.

To enhance the system the following recommended: dynamic map, map must be responsive, should have an online forum and should have a form where the admin can upload latest pictures.

The study was proportional in the system, both system were online which used PHP as programming language, JavaScript as scripting language and CSS and HTML for the design of the system. Both system used XAMPP application and Sublime text for editing codes. Both system also used MySQL as a database. In online ticket reservation, customer can view the information about price, date of travel and availability of the schedule like in online mapping having a user that can view about UMHAI, projects, org chart, etc.

Online Loan Application and Information System for Muslim Kristian Vendors Association Inc. The Muslim Kristian Vendors Association Incorporated is a micro lending and microfinance association for small business. The organization aims to help people start a small business and increase to bigger assets. Applicants of the association must provide the requirements for them to become a member. The association organizes the small vendors and other sub-sectors of urban poor and educates them about their situation towards addressing the issues and problems directly and indirectly affecting them. Enhancing, capacitating and empowering the small vendors and other subsectors of urban poor enable them to participate in the community development. This is to promote the total well – being of MUKRISVA members and to contribute to the economic growth of their community.

MUKRISVA is currently using a manual operation. The association posts a weekly announcement for the weekly meeting, making invitations to each member, club activity, receiving comments, suggestion and question within the meeting and compiling hard copy of records and documents. These transactions make the club unorganized and time consuming (Adtiz *et al.* 2010).

The study was connected to the system in a style that both system was online based or web application. Both system has same programming language used. The study has the administrator account to create, save, edit and maintain and also to control and access the database like in Online Based Mapping Directory System.

Web-Based Student Information System for the University of the Cordilleras. As studied by Usan (2012), student information system houses vital data about the students of an educational institution. The data housed in these information systems vary, depending on its complexity and the institution. Typically, however, these information systems house data about grades, personal information, and financial accounts. Web-based student information systems (WSIS) are student information systems that provide an additional layer of convenience for users-data found in WSIS are available anytime to all authorized users who have access to an internet-connected computer. Users of WSIs range from students to parents to teachers and school administrators.

The study was linked to the system in manner that the main objectives of the study was to design and develop a web-based student information system like in system that the objective is to develop Online-based Mapping Directory System. Both system has a combination of username and password which served as a security login form of the system. Lastly, both system used PHP, JavaScript as programming language and MySQL as database of the system.

Automated Student Attendance Monitoring System using RFID Technology. The study of Cabai (2013), the study entitled Automated Student Attendance Monitoring System using RFID technology was created to record students' attendance automatically. It used student ID card as RFID tag and a RFID reader. This RFID system was integrated together with software. The method was more effective to prevent problem in process getting attendance manually.

The study would benefit the students and professors of University of Perpetual Help System Delta giving them a friendly interface and more time for teaching and learning.

The study was related to the system in a style that the study focus on developing of ID card as RFID which to prevent problem in process of getting attendance manually. Like in Online Based Mapping Directory System that used temporary card and temporary ID to prevent visitors from accessing inside the village without getting his/her information.

Web-Based Faculty Evaluation System of Apayao State College, Philippines. As indicated by Taguiam (2016), stated that in Apayao State College (ASC), the student evaluation for teachers is usually conducted every first week of October and last week of February for the whole academic year. This activity is done in a classroom on a regular basis. The chair of the department is usually the one in charge of floating the instrument to the students as well as collecting the forms, computing for the individual performance of the faculty, organizing, and summarizing. The researcher used the methodology by Nunamaker et al. (1990) in designing the Web-based Faculty Evaluation System, which was created on a PHP/MySQL platform.

A web-based program improved the current system of evaluation to facilitate efficient conduct and to replace or supplement the traditional system of using papers. Specifically, the objectives of the study are to: 1) Determine the existing evaluation process 2) Develop a Web-based faculty evaluation; and 3) Assess the acceptability of the system.

The study was linked to the system because both system used PHP as programming language of the system and MySQL as the database. The said study was a web-based program which was like in the Online Based Mapping Directory System.

Web-based Voting System for Student Council. As stated by Belda and Matalines (2013), mentioned that the Web – based Voting System for Student Council was developed in PHP programming language. The system was designed as a user–friendly program. Users can access the software anywhere in any kind of gadget that has an internet connection. The system is created for three kinds of users the organizers, candidates and voters.

The system enables the organizers to easily manage an election. The system has a feature that candidates for this election can post their platforms. One of the objective of the system is to make a convenient way for the voters to cast vote easily.

The study was conveyed in a style that the general objective of the study was to develop a web-based voting system for student council election like in online mapping directory system. Both system used PHP as programming language and designed as a user-friendly program.

Online Job Application System for JCCI John Clements Consultants Inc.

As studied by Pereyra (2013), indicated that it was important that employers have an accessible system to access applicants. Examination and applications should be online – based so that the availability and accessibility become accurate. The developed system covered the initial procedures of a job application. The procedures included the resume uploading, profile creating and online examination.

The procedure dynamic web pages for the Online Job Application System for John Clements Consultants Inc., the proponents used the PHP Programming Language, with a little touch of JavaScript while for the database, the proponent used the MySQL (phpmyadmin). The proponent also designed an online exam generator for the administrator's use.

The system had satisfactorily met the requirements to be considered as a system that is useful and has a user – friendly interface. Also, the system had successfully satisfied the objectives for which it was designed for. Based on the system

evaluation of respondents, the Online Job Application System for JCCI passed the ISO 9126 standard.

The study was connected on the system in manner that the main objectives of the system was to develop an Online-Based job application like in system that the objective was to develop an Online Based. The study used PHP as a main programming language of the website and MySQL as database. Both system are eco-friendly to all users.

Online Work Order Management System for Marketing Insighting & Foresighting, Inc. (MIFI). As eloquently stated by Bendicion (2013), the main objective of the study was to develop an online work order management system for Marketing In sighting and fore sighting, Inc. (MIFI) that enables its employees to view and update schedules, doctor information, area and hospital information. The system provides a central data repository which minimizes data inaccuracy and inconsistency, confusion, and provides a systematic management of important information that are used in MIFI's day-to-day effective operation.

The study was related in a style that the study has an employee which enables to view, and update schedules. Like in mapping directory system which having employee to enable of viewing the map, creating temporary ID and temporary card. Both system was online.

Web-Based Information System of CS Torralba Centre for Performing Arts. As studied by Apelit and Sadio (2015), mentioned that the study was conducted to develop a Web-Based Information System for CS Torralba Centre for Performing Arts. This provides an efficient way of managing information of the school, providing information needed by the people to know more about CS Torralba, updating students by announcements and advertise the school online to other people rather than doing processes manually in the day it was traditionally done.

The software was developed through the use of various development, such as Adobe Photoshop CS6, PHP and JavaScript for coding, CSS for the design of the system, and Microsoft Word 2007 for documenting the whole study.

The study was linked to the system in a style that the main objectives of the study is to create a Website for CS Torralba Centre for performing arts. Both system used PHP as programming language and MySQL as database. Both system has an admin which have control the whole system and also it has a report module which can view the list of information about the students like in mapping directory that can view the visitor per month.

Table 1 shows the comparison of the related local studies. It includes the systems, author(s) and year, methodology, objective and contribution to the study.

Table 1. Comparison of related local studies

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
Information Kiosk with 3D mapping of Bacoar Government Center	Caluracan, M. & De Leon, D. 2017	Fourth Generation Technique (4GT)	To design Information Kiosk with 3D mapping for visitors in Bacoar Government	Generate the visitor location to the places in short path way inside the city hall
Information System and Kiosk Directory of Southeast Asian Medical Center	Balansag, R. <i>et al.</i> 2016	Fourth Generation Technique (4GT)	To develop and kiosk directory of southeast asian medical center	Generate an Directory that allowed the visitors to navigate the places in short path way inside the city hall
Nasugbu Malunggay Information and Mapping system	Salac, A. <i>et al.</i> 2014	Waterfall Model	To develop a Malunggay Information and Mapping System	Generate malunggay information to benefited the citizen of Nasugbu to find a malunggay tree in area
Development of Homeowners Association Website for Gardenia Valley	Laureano, C. & Pedron, L. 2013	Capability Maturity Model Integration (CMMI, 2002)	To develop Association Website of Gardenia Valley	Generate an easy access of homeowners with their monthly dues and water bill records through online viewing
Online Cemetery Management of Heavenly Peace Memorial Garden	Lorenzo, M. & Seniorin, T. 2016	Fourth Generation Technique (4GT)	To improve the manual system in retrieving graves and disseminating information of availability lots	Generate direction for the missing graves and information about the ability of lots and promos

Table 1. Continued

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
Online Grade Management System of Cavite State University Bacoar City Campus	Anthony, C. & Loriezo, M. 2018	Agile Methodology	To develop an Online Grade Management System of CVSU-Bacoar City Campus	Generate an online grade viewing and information about students
Online Load Application and Information System for Muslim Kristian Vendors Association Inc.	Adtiz, M. <i>et.al</i> 2010	Spiral Model	To develop a system that will improve the manual transaction of the current system of the Muslim Kristian Vendors Association	Generate module online payments for membership, loans and module for loans transaction of the association such as loan request, renewal, and approval
Web-Based Student Information System for the University of the Cordilleras	Mang-Usan, A. 2012	Agile Methodology	To develop an online viewer of grades, personal information and financial accounts of student	Generate an student online viewer to easily access the personal information and grades by accessing the WSIS through internet
Automated Student Attendance Monitoring System using RFID Technology	Cabañeros, M. 2013	Prototyping	To develop RFID system to monitor and easily record the attendance of students	Generate an easy access of homeowners with their monthly dues and water bill records through online viewing
Web-Based Voting System for Student Council	Belda, S. & Matalines, C. 2013	Agile Methodology	To develop a web-based voting system for student council	Generate an user-friendly voting system that enables organizers to easily manage an election

Table 1. Continued

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
Online Job Application System for JCCI John Clements Consultants Inc.	Pereyra, M. 2013	Waterfall Model	To develop an dynamic web pages for the Online Job Application System	Generate an Online Job Application to easily accessible to every employers
Online Work Order Management System for Marketing Insighting & Foresighting Inc. (MIFI)	Bendicion, A. 2013	Scrum methodology	To develop an online viewer of grades, personal information and financial accounts of student	Generate an student online viewer to easily access the personal information and grades by accessing the WSIS through internet
Automated Student Attendance Monitoring System using RFID Technology	Apelit, K. & Sadio, M. 2015	Scrum methodology	To developed an web-based information system of CS torralba centre for performing arts	Generate an efficient way of managing information of the school.
Online Ticket Reservation System with Mapping of Interisland Airlines	Alonzo, M. & Gianan, T. 2016	Agile Methodology	To develop an Online Ticket Reservation System for Mapping of interisland Airlines	Generate an dynamic map for customer and online ticket reservation

Table 2 shows the comparison of the related foreign studies. It includes the systems, author(s) and year, methodology, objective and contribution to the study.

Table 2. Comparison of related foreign studies

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
Designing and Evaluating a UI for Helping Users Uncover and Create Missing Road Segments on a Geo-wiki	Liu, Y. 2013	Remote User Study	To designed an Create missing Road on a Geo-wiki for cyclist	Generate an designed map matching algorithms and automatically updates the map as necessary based on user decision
E-Gatepass System	Langre <i>et al.</i> 2018	Prototype	To design an E-Gatepass system	Generate a system was used to record details and various activities of user and the admin to monitoring all the user
Navigation and Mapping through Automated Image Understanding and Retrieval	Valluri, J. 2009	Research Approach	To develop a Navigation and Mapping through Automated Image Understanding and Retrieval	Generate an image retrieval system for a large database of street level images
Tourism-Recreational Activities of Locals and Tourists in Hood Canal, Washington using ArcGIS	Hanein, C. 2014	Prototype	To develop Tourism-recreational Activities and locals and tourists in Hood Canal, Washington using ArcGIS	Generate an social data using an online map survey to understand the activities of Hood Canal locals and people
A Web-based Content Management System	Rameshbhai, K. 2011	Research Approach	To develop web-based content management system	Generate an simple user friendly interface where the faculty can enter/maintain personal information

Table 2. Continued

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
Online Map Application Tracking Vehicles and Personnnel	Padam, H. 2011	Prototype	To develop a cost effective web based applications to track vehicles of the taxi company through receiving GPS	Generate an online map application to track vehicles and taxi company
Map-basedd IOS Application Development using ArcGIS Runtime SDK	Belyavaskiy, J. 2015	Prototype	To develop web-based student information management system	Generate an management of accurate, up-to-date information regarding a students
Web-based Document Management Systems in Construction Industry	Wong, Y. 2012	Prototype	To develop an web-based document management system in the construction industry	Generate and web-based document management systems and shortfall of use viewed by construction practitioners in HK
A Web-based Information System for a Regional Public Mental Healthcare Service Network in Brazil	Yoshiura, Y. <i>et al.</i> 2017	Prototype	To develop web-based information system for a regional public mental healthcare service network in brazil	Generate a web-based system of the healthcare system and addressed service specific needs, enabling: detailed patient information sharing
Web-based Project Management System	Aadamsoo, L. 2010	Boehm's risk engineering task breakdown	To develop a web-based project management system	Generate a web-based project management system and showing how it helps users to handle projects

Table 2. Continued

SYSTEM	AUHTOR(S) / YEAR	METHODOLOGY	OBJECTIVES	CONTRIBUTIONS
A Web-based Appointment System to Reduce Waiting for Outpatients: A Retrospective Study	Cao, G. <i>et al.</i> 2013	Prototype	To develop a cost effective web based applications to track vehicles of the taxi company through receiving GPS	Generate an online map application to track vehicles and taxi company
Map-based IOS Application Development using ArcGIS Runtime SDK	Kim, Y. 2016	Prototype	To developed student user satisfaction with web-based information system in korea universities	Generate a web-based information system in higher education in korea and increased importance both in education/research activities.
Designing Secure Web and Mobile Based Information System for Dissemination of Students Examination results: The Suitability of Soft design Science Methodology	Nfuka, K. & Sanga, Y. 2016	Soft System Methodology	To develop and secure web and mobile based information system for dissemination of students examination	Generate a secure architecture design of information system for dissemination of students examinations results can be replicated to schools, colleges or universities
A Study of Web Portal Features as a knowledge Management System in School Education	Rao, J. 2016	Prototype	To develop a study of web portal to discover the university needs	Generate an web portal to benefited the student and universities

Table 3 shows the comparison of the system to other existing systems. It shows the same idea of the features of the existing system from the proposed system. The legend shows the title of the existing system.

Table 3. Comparison of the proposed system to other existing systems

FEATURES	EXISTING SYSTEM										PROPOSED SYSTEM
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	
Security Access	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Map Directory	✓	✓									✓
Visitor ID/Card					✓						✓
Online Based	✓		✓	✓						✓	✓
Generate Reports	✓	✓	✓	✓	✓	✓				✓	✓

Legend:

S1: Online Cemetery Management of Heavenly Peace Memorial Garden

S2: Information Kiosk with 3D mapping of Bacoar Government Center

S3: Online Load Application and Information System for Muslim Kristian Vendors Association Inc.

S4: Web-Based Student Information System for the University of the Cordilleras

S5: Automated Student Attendance Monitoring System using RFID Technology

S6: Web-Based Faculty Evaluation System of Apayao State College, Philippine

S7: Web-Based Voting System for Student Council

S8: Online Job Application System for JCCI John Clements Consultants Inc.

S9: Nasugbu Malunggay Information and Mapping System

S10: Online Grade Management System of Cavite State University Bacoar City Campus

Table 3. Continued

FEATURES	EXISTING SYSTEM				PROPOSED SYSTEM	
	S11	S12	S13	S14	S15	
Security Access	✓	✓	✓	✓	✓	✓
Map Directory	✓		✓			✓
Visitor ID/Card						✓
Online Based	✓	✓	✓	✓	✓	✓
Generate Reports	✓	✓	✓	✓	✓	✓

Legend:

S11: Information System and Kiosk Directory of Southeast Asian Medical Center

S12: Web based Information System of CS Torralba Centre for Performing Arts

S13: Online Ticket Reservation System with Mapping of Interisland Airlines

S14: Development of Homeowners Association Website for Gardenia Valley

S15: Online Work Order Management System for Marketing Insighting & Foresighting, Inc. (MIFI)

✓ : Included in the system

Table 4 shows the comparison of the system to other existing systems. It shows the same idea of the features of the existing from the proposed system. The legend shows the title of the existing system

Table 4. Comparison of the proposed system to other existing systems

FEATURES	EXISTING SYSTEM									PROPOSED SYSTEM
	S1	S2	S3	S4	S5	S6	S7	S8	S9	
Security Access	✓	✓			✓	✓	✓	✓	✓	✓
Map Directory	✓			✓	✓	✓				✓
Visitor ID/Card		✓	✓							✓
Online Based					✓		✓	✓	✓	✓
Generate Reports		✓	✓		✓	✓	✓			✓

Legend:

S1: Designing and Evaluating a UI for Helping Users Uncover and Create Missing Road Segments on a Geo-wiki

S2: E-Gatepass System

S3: Navigation and Mapping through Automated Image Understanding and Retrieval

S4: Incorporating Social Spatial Data in Sustainable Management: Mapping Tourism-Recreational Activities of Locals and Tourists in Hood Canal, Washington using ArcGIS.

S5: Online Map Application Tracking Vehicles and Personnel

S6: Map-Based IOS Application Development using ArcGIS Runtime SDK

S7: Web-Based Student Information Management System

S8: A Web-Based Content Management System

S9: Web-Based Document Management Systems in the Construction Industry

Table 4. Continued

FEATURES	EXISTING SYSTEM					PROPOSED SYSTEM	
	S10	S11	S12	S13	S14	S15	
Security Access	✓		✓		✓	✓	✓
Map Directory							✓
Visitor ID/Card							✓
Online Based	✓	✓	✓	✓	✓	✓	✓
Generate Reports	✓	✓			✓		✓

Legend:

S10: A Web-Based Information System for a Regional Public Mental Healthcare Service Network in Brazil

S11: Web-Based Project Management System

S12: A Web-based Appointment System to Reduce Waiting for Outpatients: A Retrospective Study

S13: Student User Satisfaction with Web-based Information System in Korea Universities

S14: Designing Secure Web and Mobile-Based Information System for Dissemination of Students' Examination Results: The Suitability of Soft Design Science Methodology

S15: A Study of Web Portal Features as a Knowledge Management System in School Education

✓ : Included in the system

MATERIALS AND METHODS

Materials

The hardware used for designing and developing the software was Acer Aspire E5-475-35CL. The processor was Intel® i3® Quad-core processor 6100U® 2.3 GHz. The memory was 4.00 GB and the operating system was Microsoft System Windows 10 Home x64.

The programming language used was Hypertext Pre-processor (PHP) for scripting language and XAMPP v3.2.2 as a server of the system and Google Chrome 72.0.3626.121 used to run the system. It also used Microsoft Word 2013 for documentation, ArcGIS Online for 2D map, Adobe Photoshop CS6 for the graphical user interface and Flash Professional CS4 for making animation line to show paths.

Methodology

Fourth Generation Technology (4GT) was used as software development methodology. The methodology was a tool which used the non-procedural language for report generation, database query, and manipulation of data, interaction of screen, definition, and generation of code, spreadsheet capabilities, high level graphical capacity and others. Similar to any other methodologies, 4GT also required analysis step until the operational prototyping begins. The most essential phase of the 4GT was the Interaction with the client. Implementation, cost and functioning of the system took in this place. The Fourth Generation Technique was successful in executing smaller applications because this could switch from the requirement analysis phase to the implementation phase.

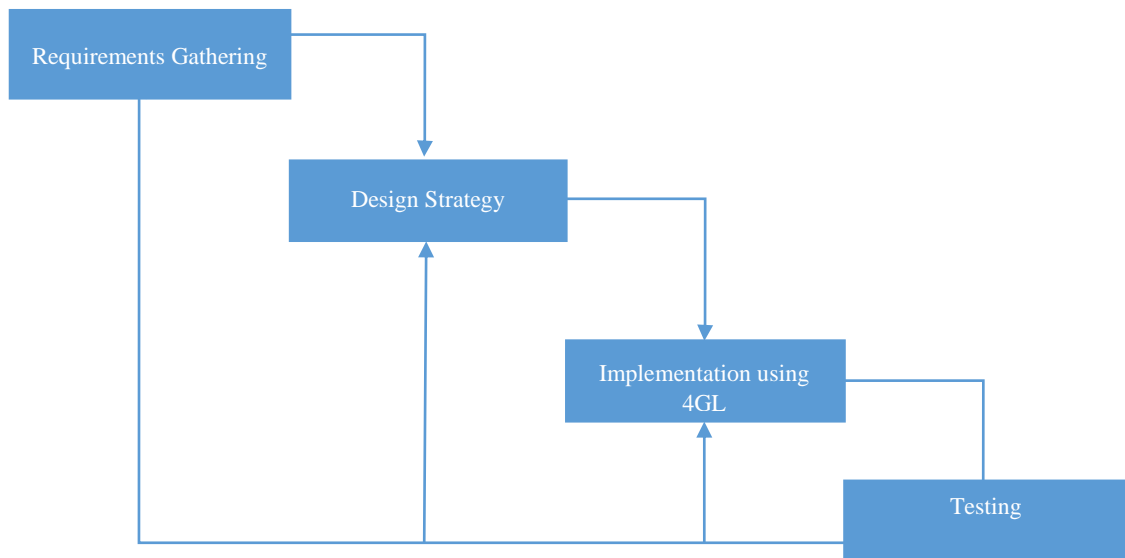


Figure 2. Fourth Generation Technique Methodology

Requirements Gathering

Requirements gathering was generally the first part in any software methodologies. Included the necessary information that needed in creating the system. This phase could be best done by interviewing the respondent and other people who have extensive knowledge in developing a specified system.

In connection to this, the needs and conditions of the clients were determined and analyzed. Interview (see Appendix 1) were conducted in May 2018 with Mr. Leonardo A. Valencia the president of UMHAI, to know the needs of client.

The client wants and need were broken down and used as a guide for developing the system. The developer also go from different libraries such as Cavite State University-Bacoor, Perpetual Help Delta University and Mapua University to gather information.

Design Strategy

The second phase of 4GT was the Design Strategy. In this phase were the researchers formulated, gathered data and analyze to make a good system. The

developers determined the type of problem in giving solution to the problems encountered through the use of interview.

The developers designed the flow of the system with the used of the Fish Bone Diagram, Entity Relation Diagram, Use Case Diagram, Hierarchical Input Process Output Diagram, Context Diagram and Data Flow Diagram. Fish Bone Diagram (see Appendix Figure 1) was used to see the manual activity process of client. Use Case Diagram (see Appendix Figure 2) to determine the level of access of employee, admin and user. In connection with this, Entity Relationship Diagram (see Appendix Figure 3) was used to normalize the database in regards to the entities, Hierarchical Input Process Output (see Appendix Figure 4) is a top-down visual representation of the main process in the system and it should be user friendly, Context Diagram (see Appendix 5) used to identifies the flows of information and lastly, Data Flow Diagram (see Appendix Figure 6) provide a graphical representation of how information moves between process in a system.

Implementation using 4GT

The third phase of 4GT was where the design presentation was translated to a coding that resulted as an instruction that could be executed by the computer. The developers used Hypertext Pre-processor (PHP) and Hyper Text Mark-up Language (HTML) as a programming language and used for the development of the system. JavaScript used to add intriguing intuitive capacities to a webpage. Cascading Style Sheet (CSS) used for the designing of webpage. The developers used My Structured Query Language (MySQL) as a database of the system. Lastly, the ArcGIS online used as a map of the system.

Testing

The phase was usually done in order to truly examine the system if it was fully functioning and if it was not committing any errors. System would be examined based

on its functionality and most importantly to test if the system met all the requirements of the client. The different testing tools used such as: Unit testing (see Appendix Table 3), Integration Testing (see Appendix Table 4), System Checklist (see Appendix 2) were utilized and Alpha testing used by the developers to identify all possible issues or bugs and Beta testing for client and user acceptance (see Appendix 5).

Participants of the Study

Table 5 shows the breakdown of the respondent based on quota sampling assembled sample has the same proportion of individual as the entire population with respect to known characteristic, traits or focused phenomenon. The respondents of the study is composed of 10 DCS Instructors, 15 UMVHAI staffs and 95 homeowners.

Table 5. Breakdown of the Respondents on the Software Evaluation

CLASSIFICATION	FREQUENCY	PERCENTAGE
DCS Instructors	10	8.33
UMVHAI Staffs	15	12.50
Homeowners	95	79.17
TOTAL	120	100

Statistical Treatment of Data

In order to confirm the needs in gathering data for the study and the instruments used for the system evaluation, this process is needed to show the reliability of the study.

1. Percentage. It was used in tabulation, presentation, and interpretation of the respondents in the proposed study.

Formula:

$$P = \frac{f}{n} \times 10\%$$

Where:

P = percentage

f = frequency

n = total number of respondents

2. Weighted Mean. It was used to determine the total evaluation of the study in accordance to the W3C standard.

Formula:

$$W.M. = \frac{\sum wx}{n}$$

Where:

WM = Weighted mean

x = Frequency

w = Weight

n = Total number of respondents

3. Likert Scale. It was used to interpret by using the five level Likert Scale Method as a criteria which will serve as the basis for the interpretation of the data.

Table 6. Shows the equivalent of Interpretation of the data

RATE	EQUIVALENT	VERBAL INTERPRETATION	SYMBOL
5	4.20 – 5.00	Excellent	(E)
4	3.40 – 4.19	Very Satisfactory	(VS)
3	2.60 – 3.39	Satisfactory	(S)
2	1.80 – 2.59	Fair	(F)
1	1.00 – 1.79	Poor	(P)