## Nagcarlan, Laguna Scholars Information and Management System

A Capstone Project Presented to the

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## BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

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**ABSTRACT**

The study, titled "Nagcarlan Scholar Information and Management System," is a web-based system which encodes and stores the data of all the government scholars in Nagcarlan, Laguna. The system aims to monitor the academic performance of every scholar in Nagcarlan, Laguna and keep the information of the scholars updated from time to time. This system stores and sorts the data of all the scholars including their personal information and their academic status. The system will organize and sort all the lists so that the Municipality of Nagcarlan Laguna can easily track the scholar's status and performances and was solely based on the results of a rapid application development, for which the researchers went through a variety of procedures and tests. The researchers will discuss the techniques and steps they took to achieve a desirable and effective study outcome. Nagcarlan Laguna has 200 scholars that manual way of sorting and processing of scholar's documents. As a result of an in-depth interview with Head IT in Municipality of Nagcarlan, Laguna the researchers came up with "Nagcarlan Laguna Scholar Information and Management System". The goal of the study is to help the Municipality of Nagcarlan, Laguna to analyze, sort and manage the data of every scholar and to let the new applicants register in this system and upload their documents for their registration.

**Keywords:** *Scholars, Information, Scholar Management, Rapid Application Development*

## CHAPTER I INTRODUCTION

Scholarship has always been a great helping hand to every student across the country. It is an important program of the government and non-government units that has benefitted millions of students. Different scholarship programs are offered such as academic scholarship, scholarship for athletes’ students, scholarship for those OFW Families and many more. A scholarship program provides an opportunity to all students who can meet up with the certain grade/average requirement of the type of scholarship. These scholarship programs help lessen the burden of paying fees when pursuing a degree. And as for the scholar students that receive the benefits, they may need to do their duties by devoting time on their academics. Scholarship beneficiaries’ academic performance from time to time must be monitored and checked to keep updated.

The Scholars Information and Management System, Nagcarlan, Laguna is a web-based system which encodes and stores the data of all the government scholars in Nagcarlan, Laguna. The system aims to monitor the academic performance of every scholar in Nagcarlan, Laguna and keep the information of the scholars updated from time to time. This system stores and sorts the data of all the scholars including their personal information and their academic status. The system will organize and sort all the lists so that the Municipality of Nagcarlan Laguna can easily track the scholar's status and performances. In addition, the system can also process the application of new scholars through registering and uploading their requirements in the system so that administrators can verify the new applicant's information and check whether they are qualified or not.

## Project Context

As years pass by, the number of scholars will increase along with the number of documents. With so many documents, it is inevitable that some of them will be lost. The scholars will present documents such as Copies of Grades, Copy of Registration, Student ID, and Voter ID or Barangay ID of parents. The COVID-19 pandemic changes the way people interact and communicate. People are limited to going places, and the government has implemented social distancing. That is the problem faced by the municipality. They need to limit the people in the building and limit the people going into the municipality.

As of the moment the Municipality of Nagcarlan has around 200 scholars with many students still trying to apply for scholarships. But then, Nagcarlan's scholarship management remains a manual way of sorting and processing of scholar's documents. The scholars processed their hard copy documents to achieve the scholar grants. As the years passed by, the number of scholars grew as well as the documents holding their information making it a bit difficult to maintain and store their data manually. This is what the project aims to resolve. That is to let go of the traditional way of manually processing the data and go in a more convenient way of using a web-based system that is efficient and effective. With the Nagcarlan Laguna Scholar's Information and Management System, it would be easier to store, check and manage all the data of the scholars without the hassle of keeping piles of papers in their offices. Also, new applicants can register online, upload the required documents and then the administrators can check and verify their applications. This is timely and relevant as the Pandemic still limits the physical interactions as much as possible.

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## Research Objective

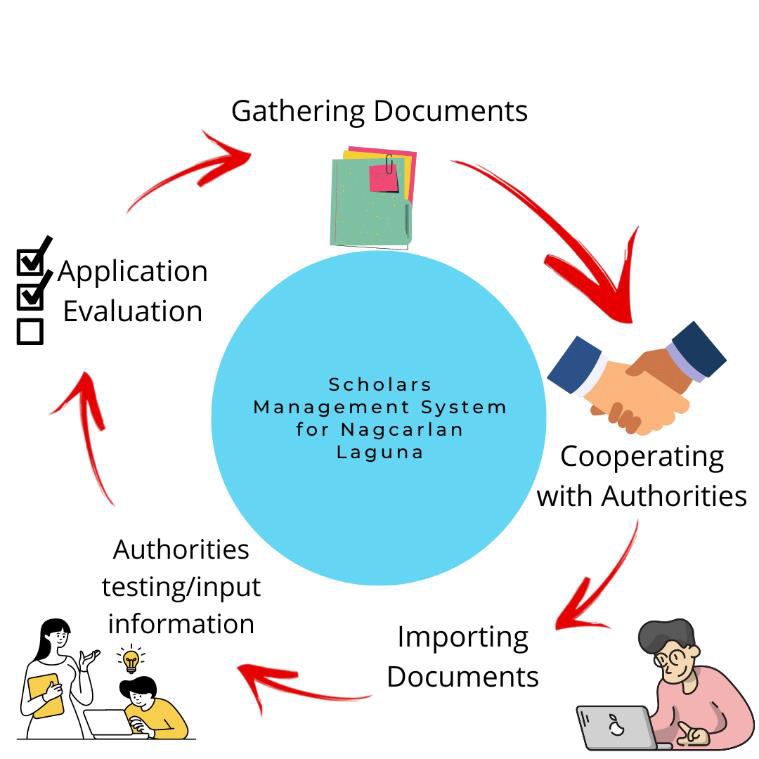
The General Objective of this study is to develop,design, evaluate, and test a web-based Management System for Scholars in Nagcarlan, Laguna and to simplify in terms of processing documents, how would this assist the Nagcarlan Municipality's Scholar Facilitator.

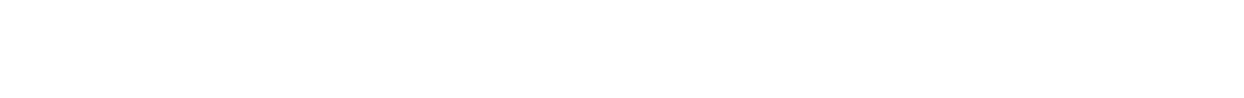
This system specifically to aims to:

1. To design and develop a web-based Scholar Information and Management System for Nagcarlan Laguna.
   1. Scholar's personal information
   2. Scholar's academic status and performances (includes the grades, units earned and GWA)
2. To analyze, sort and manage the data of every scholar in Nagcarlan Laguna.
   1. Scholar's data management
   2. Scholar's data updates
3. To simplify the process of documents in order to receive the scholarship grant and let the new applicants register in this system and upload their documents for their registration.

## Conceptual Framework

This section of the study shows the research model consisting of input, process, and output that describe the requirements, research methodology used, and the output of the study.





***Figure 1. Input Process Output (IPO). The conceptual framework shows the needed information to fully understand the system. Through knowledge requirements, it can meet the system process. The proponents used the agile method that comprises various approaches to software development.***

## Project Purpose

The purpose of the system is to provide an easy and more manageable scholar system to lessen the hassle of dealing with a pile of papers and documents in both Scholar and the Scholar Facilitator of Municipality of Nagcarlan, especially so that the number of scholars can grow even more in the future. Also, since the Pandemic is still existing, this system can make a big difference as to limiting the physical interaction between the scholars plus they can save their money for transportation as they can transact virtually. The Nagcarlan-Laguna Scholar Information and

Management System may also manage documents that are difficult to review and verify manually, but it is much simpler to do so with the Scholar system, which can reduce the time required by the Scholar Facilitator of the Municipal Hall.

## Scope and Limitations of the Study

The study will mainly focus on designing and developing a Scholars Information and Management System that will help to sort, store, and manage the data of the scholars in Nagcarlan Municipal. The study will mainly focus on designing and developing a Scholars Information and Management System that will help to sort, store, and manage the data of the scholars in Nagcarlan Municipal. This study covers the development of the web-based system for the Scholar's information and data management for both Senior High School (of any SHS Strand) and College Scholars (of any Course). It includes the grantee's personal information, academic status and performance, submission of requirements and academic updates. This will help for an easier tracking and monitoring of the grantee's account in a more convenient system. In addition, whenever there is an opening for new scholars, interested applicants can register and upload their requirements on the system as well.

The system is only limited to the Academic Scholars of the Local Government of Nagcarlan, Laguna. Scholars under the private sectors and non-academic scholars are not included. Anyone with internet connection is able to access the application and carry out the procedures.

## CHAPTER II

**REVIEW OF RELATED LITERATURE**

This part of the research analyzes the relevant literatures to support the researchers' study. Reading some of the articles has really aided in deepening one's awareness of how learning researchers are vital in advancing the system's capacity for learning.

## Scholarships

A grant or payment made to support a student's education, awarded based on academic or other achievement.

A project by B.tech entitled “Scholarship Information System documentation” This project is developed for scholarship departments of a group of colleges. Though via media systems are very popular, the majority of students are not aware of various schemes of scholarships applicable to them. To have a general awareness it will be more convenient if each educational institution takes active participation in the implementation of various scholarships schemes under their supervision. At the time of giving application, the scholarship officer can add data with regards to the student’s parent’s income, caste, merit etc. concerned with scholarships. Institutions once can very well sort out eligible students for various types of scholarship. The campus information system here developing will help to get up-to-date information of a student regarding his both academic and nonacademic activities. It will be an inducement to improve the quality of study thereby attaining high standards.

A study by Eric Irvin Sauser, May (2011) entitled “SCHOLARSHIP MANAGEMENT SYSTEM” The Scholarship Management System is a web‐based information system designed to assist with the scholarship awarding process at the University of Northern Iowa (UNI) College of Business Administration (CBA). The

system’s primary uses include tracking the status of scholarship awards and viewing data regarding scholarships and applicants. The system also includes functionality to add, edit, and delete any stored data, as well as to generate highly customizable reports. Although the primary users of the system are the scholarship coordinator and assistants, the system also allows scholarship recipients to interactively respond to their awards. Although the system itself is the primary deliverable, developing the actual system code was a relatively small portion of the entire project. To develop the system, I followed the Systems Development Life Cycle (SDLC) methodology which includes system definition, requirements analysis, system design, and implementation.

According to Falogme et al., (2017), it is for the Scholarship office of a city to render the best service for the clients. Primarily, the office personnel of the said office are having their transactions using MS Excel in keeping records of students’ profile and funds. The record, which is taken by the scholarship head, returns the information of the qualified applicants for scholarship. Each application will undergo strict screening and one of its major requirements is that the scholar applicant must be a bonafide resident of the said city. In using MS Excel, the scholarship head consumed a lot of time before they could finish recording all the transactions per day. One thing that makes it complicated is that there is tons of data that needs to be updated about the scholars each time. It takes a month or few for the scholarship head to readily update the records need to be updated about the scholars each time. It takes a month or few for the scholarship head to readily update the records.

A study by Prince Ariel R. Alvaro and Von P. Gabayan Jr (May 2021) entitled “Scholarship Information Management System with Academic Performance Predictor and Decision Support System” Nowadays, technology is rapidly evolving and

growing. Technology provides vast information services in education, agriculture, and sophisticated finance processes. Hence, technology in education is used globally in today's generation in terms of school reports, enrollment, and scholarship. "Scholarship Information System" is a software package developed for managing students' scholarship details, branch details, and college details. The software is very helpful in finding eligible candidates from different colleges. The project finds the eligible candidates from the student's list based on marks, caste, sports, and income.

A study by JINTO TOM and BIBIN MICHAEL (OCTOBER 2018) entitled “SCHOLARSHIP MANAGEMENT SYSTEM” The aim of this project is to computerize the operation of the available SCHOLARSHIPS in the college. It is very difficult to manage all the work manually. There may be many problems in accuracy, managing information etc. The proposed system has been designed to replace the existing manual system and is user friendly.

A study by Mohammed Abdullahi Jibrin, Muhammad Ndagie Musa and Shittu Tahir (2016) entitled “Development of E-Scholarship System” Scholarship is a critical tool to facilitate education for eligible students, especially those who are socially and economically challenged in the state and bring them on to the mainstream development track. Niger State Scholarship Board processes a large number of scholarship applications every year. Processing these applications is always time- consuming and prone to errors due to their current paper-based system of processing. In this paper, an e-Scholarship System was designed and implemented to allow students of Niger state indigene across the country apply for scholarship online with the Niger State Scholarship Board.

A study by Wen-Kai Shen (January 2011) entitled “An Online Scholarship Application System” At the University of Wisconsin-La Crosse, both freshmen and continuing students can apply to many scholarships. They need to apply for scholarships explicitly illustrating their qualifications and eligibility for the scholarships they apply. There are various criteria to satisfy when a student applies for a scholarship. The majority of criteria are based on students’ merits and other academic performances. Their financial information in FAFSA is another main consideration for how much scholarship they can receive. Some scholarships may also require that applicants must take specific courses or select a particular major. The UW-L Foundation Office plays the role as a sponsor in maintaining scholarships information, processing applications and eventually either awarding or rejecting the scholarship applications.

An article by Jaydeep Chakraborty, Gurusrikar Thopugunta and Srividya Bansal (February 2018) entitled ”Data Extraction and Integration for Scholar Recommendation System” Recommendation systems have been an integral part of massive open online courses (MOOCs). With a large amount of availability of data and resources, recommending scholars and professors through general reviews and academic advisor applications has become a tiresome job. Finding professors and scholars relevant to a student's area of interest involves a combination of multiple factors like field of study, depth of research area, research background of professors, ongoing research opportunities, etc. As recommending scholars and professors deals with so many different factors, it is very complex and unreliable when done manually. In this paper, we present a content-based mining approach to go through all relevant resources, extract required information, and use it to recommend a list of scholars

based on the student's area of interest. For our experimental model, we gathered information about several professors at our institution from various web resources such as IEEE, Springer, ACM, Sciencedirect, arxiv and the department website. We use topic modeling and clustering algorithms in our content-based mining approach. We present a comparative analysis of the following topic model algorithms: latent dirichlet allocation (LDA), hierarchical dirichlet process (HDP), latent semantic analysis (LSA) and clustering techniques: k-means and hierarchical clustering in determining the most accurate recommendation list of professors or scholars.

A study by James Alec Love, Jr (August 2014) entitled “INFORMATION SYSTEMS SCHOLARSHIP: AN EXAMINATION OF THE PAST, PRESENT, AND FUTURE OF THE INFORMATION SYSTEMS ACADEMIC DISCIPLINE”

Information systems present an unrivaled capacity to enhance decision making at all levels from simple individual tasks to complex global challenges. In the large-scale context, the application of information systems to collaboratively achieve societal good is still in its nascence; therefore, our collective understanding of its potential value is still widely unrecognized. While computerized information systems have tremendously impacted the last half-century, it is my firm belief that information systems technology will have an even more transformative influence on the next fifty years. This transformation will affect all segments of society. How we choose to engage in the coming technological advances will shape our lives either for better or worse.

Article entitled “Scholarship Information Management System with Academic Performance Predictor and Decision Support System” by Prince Ariel R. Alvaro and Von P. Gabayan (2021) Scholarship Information System is a software package developed for managing students' scholarship details, branch details, and

college details. The software is beneficial in finding eligible candidates from different colleges. This study focuses on developing ISU Ilagan Campus Scholarship Information with Decision Support System. Specifically, it aims to; (a.) create a dataset for Scholarship Information with Decision Support System; (b.) Execute Weka Machine Learning Tool in Developing a Predictive Risk Model Using J48 Algorithm for Scholarship Information with a Decision Support system, and (c.) evaluate the scholarship information with decision support system using ISO 9126. The study conducted several Interviews, Observations, and Surveys. Knowledge Discovery in Databases (KDD) was the framework of the study. Based on the Summary of findings, the researchers found that the Predictive Risk Model with 98% accuracy rate gave positive results using the developed Predictive Tool

In the study of Ott (2019) entitled “The Effects of Time Delay Procedures on the Acquisition, Maintenance, and Generalization of Spelling Sight Words for Elementary Students with High-incidence Disabilities”, many kids with impairments perform at a lesser level than their peers without disabilities when it comes to reading. In an urban school context, this study looked at how the Time Delay method affected the spelling of sight words in kindergarten and first grade for elementary kids with high incidences of impairments. Effective spelling instruction intervention packages have been shown to include immediate feedback, immediate self-correction, and repetition.

The study “Forums for information systems scholars: III” by Kent Walstrom and Bill Hardgrave (December 2001) Three hundred and sixty-four information systems faculty responded to a questionnaire rating 51 journals and 13 conferences

associated with the information systems field. In addition to rating the value of the outlets, faculty were asked to state whether a journal was published primarily to disseminate information systems research or not. Relative rankings for each journal and conference were determined. As the third in a series of studies, comparisons were made between these findings and those of previous ones. The overall stability in the rankings of journals and conferences was also identified. A few journals and conferences were rated and ranked for the first time. Furthermore, a significant increase in the ratings of “pure” information systems journals was noted.

According to Falogme et al., (2017), it is for the Scholarship office of a city to render the best service for the clients. Primarily, the office personnel of the said office are having their transactions using MS Excel in keeping records of students’ profile and funds. The record, which is taken by the scholarship head, returns the information of the qualified applicants for scholarship. Each application will undergo strict screening and one of its major requirements is that the scholar applicant must be a bonafide resident of the said city. In using MS Excel, the scholarship head consumed a lot of time before they could finish recording all the transactions per day. One thing that makes it complicated is that there is tons of data that needs to be updated about the scholars each time. It takes a month or few for the scholarship head to readily update the records.

In the case study entitled “Collaboration Among Professionals Working with English Learners with Disabilities in a Newcomer School: A Case Study” by Mann (2018), the collaboration between teachers working with newbie English learners who have disabilities was examined. According to the study, for teacher collaboration to be sustainable, there must be a common aim and purpose, open communication, and

regular assessments of student progress. Teachers will gain from obtaining professional development in the future to promote cooperative attitudes.

Based on the study by Schmidt (2019) entitled “Usability and Feasibility of an Enhanced Sexual Health Education Program for Individuals with Intellectual and Developmental Disabilities”, it is more likely for people with intellectual and developmental disabilities (I/DD) to experience sexual abuse and have unfavorable pregnancy outcomes. For people with I/DD, there are knowledge gaps in the areas of pregnancy, reproduction, and contraception, contraception, and sexually transmitted illnesses. According to this study, parental characteristics, general traits, humiliation, a lack of organizational policies and/or standards, and a lack of adequate professional training for educators and providers are the main obstacles to sexual health education. Current sexual health education procedures, which are offered by numerous stakeholders and take place during organic learning opportunities, have hurdles and gaps. The ideal learning modalities for this program are videos, images, universal design for learning, and direct, explicit instruction. Individuals with I/DD and educators found the following activities to be usable, helpful, and desirable: gender unicorn (a gender identity visual) and identity film (66 percent), anatomy video (89 percent), sexually transmitted infections (STI) infographic (85 percent), and family planning video (63 percent).

A study entitled “The Student Experience of Psychoeducational Assessment: A Phenomenological Study” by Hoffman (2021), interviews are conducted with students who have special learning disabilities (SLD) to learn more about how they felt during the psychoeducational evaluation process. Themes from the experiences include stigma, challenges with the testing process, and unpleasant interactions with professors. Students find it helpful to interact with their peers in special education.

In the study of Dougherty (2021) entitled “The Effects of District Characteristics on the Achievement of Students with Disabilities”, student achievement is impacted by district-level factors such socioeconomic status, the percentage of minorities, and instructional spending. It has been discovered that several of these characteristics significantly impact kids with impairments. Data from 108 public school districts in Northeast Ohio were taken from the website of the Ohio Department of Education.

The study entitled “Changing Educator Attitudes About Students with Disabilities Through Literature” by Moser (2020), teachers with negative attitudes toward students with impairments frequently leave them feeling disengaged and discouraged. This study looked into whether pre-service teachers' attitudes toward students with disabilities may be improved by reading a first-person narrative and participating in a book study.

In the study of Reiser (2018) entitled “An impact analysis of computer assisted instruction on the reading skills of students with disabilities”, the purpose of this quantitative, quasi-experimental study was to evaluate the effectiveness of a computer-assisted reading software. Improved reading fluency and comprehension abilities as well as higher value-added measurements of students' performance on Ohio's Common Core State Standards examinations were two potential benefits of the study for participants.

The case study entitled “A Case Study of Inclusive Leadership Competencies for Building-Level Administrators in Elementary School” by Touassi (2020), revealed administrative skills that several interested parties believe are crucial for promoting a diverse and inclusive learning environment. The answers to Research Question 1

point to the need for developing accurate, consistent data sources as well as methods for evaluating SPED services, programs, and personnel in future studies.

In the article entitled “Specific Learning Disabilities” by Agiropoulos (2019) the specific issues and challenges in the learning environments of schools are described. Several European nations' laws fully acknowledge and take into account these definitions. This article presents a preliminary analysis of the topic with the intention of educating and directing readers in the recognition and differentiation of these disorders.

A study entitled “Online Scholarship Application and Record Management

System for AYZ City” by Engr. Ariel M. Marave (March 2019) The focus of the system is to eliminate the paper works or the manual method of processing used by AYZ City scholarship office. Thus, the result will be a rapid processing of transactions. Furthermore, having an application and record management system may lessen manpower and will result in more secured, reliable, and more organized storage of data. The scholarship office should have an internet connection to access the said developed system. It has features that suit the needs of the scholarship office in managing and profiling of their scholars’ information such as approval and disapproval of scholarship. It has functions that can filter records using the search options and manage the schedules of examination, interview, and orientation of scholarship applicants. It has reports of lists of scholars per school, barangay, and year level which can be viewed and printed. The total number of scholars who will graduate in Junior high school, Senior high school and college are also included in the reports.

## Information and Management

A project entitled “Research Information Management System” by Renáta McDonnella and Simon Kerridge June (2016). It focusses on system interoperability and interface issues. KRIMSON is envisaged as a cradle-to-grave research information management system, as defined by Binge2 and elucidated by Fairly et al.3 and Wang et al.4, albeit using standard integrations rather than an enterprise service bus that they describe, with functionality for pre-award proposal tracking and approval, costing and pricing, post-award management and financial reporting, publications management, activities and event records.

Research by Jinhua Liu, Caiping Wang and Yanhua Wu (August 2021) entitled “Management Information System of College Education and Teaching Based on Web” The traditional university education and teaching management information system has the problems of low information recall, poor information precision, and long query time. Therefore, this paper designs a university education and teaching management information system based on Web. Through the analysis of the requirements of the higher education and teaching management information system, the design principle of the system is determined, and the structure design of the higher education and teaching management information system is realized; the teaching management information system management process is determined. By calculating the complexity of university education and teaching management information, the priority of query information is determined to effectively improve the processing effect of the system. Finally, the relational database model is designed to realize the design of university education and teaching management information systems. In order to verify the effectiveness of this method, comparative experiments are

designed. Experimental results show that this method can effectively improve the low information recall and the poor information precision and shorten the query time.

A project by Hemn Barzan Bdalla and Wu Fei (2014) entitled “STUDENT INFORMATION MANAGEMENT SYSTEM” The SIMS Software is an application that permits students to compare, tamper and present student's data in an important manner. The project develops student's information system for the Intranet Automation of student information management system Software. If the School of Management\University management does not have a student information management system (SIMS), they face many problems, especially about wasting time. It is hard to find data and to get any comment from students or teachers, the system has been to ease good Interaction/ communication facilities between the students and administration. In doing so, the project helps a lot in doing faster duties in University\School. There are some new ideas like (Bulletin board system (BBs board), students comment, analysis skill student, dynamical saved record). We need some methods to complete that system using detailed Unified Modeling Language (UML Diagram), Dataflow Diagrams and Entity Relationship Diagrams (E-R Diagrams). The web pages about students are created dynamically based on the student's user ID, user password and links.

An article by Alton Chua entitled “International Journal of Information Management” Many scholars and practitioners recognize the power of technology in supporting knowledge management (KM) activities. However, in most KM literature, the discussion on related technology is either given cursory treatment or confined largely to product-specific features. This reflects a division between KM consultants and KM technologists. For this reason, the objective of this paper is to develop a knowledge management systems architecture that seeks to bridge the gap between

consultants and technologists. The architecture is intended to provide a common framework for reviewing how technologies are used to support KM processes.

A study by Praveen Yalagandula and Mike Dahlin (Oct 2004) entitled “A Scalable Distributed Information Management System'' We present a Scalable Distributed Information Management System (SDIMS) that aggregates information about large-scale networked systems and that can serve as a basic building block for a broad range of large-scale distributed applications by providing detailed views of nearby information and summary views of global information. To serve as a basic building block, a SDIMS should have four properties: scalability to many nodes and attributes, flexibility to accommodate a broad range of applications, administrative isolation for security and availability, and robustness to node and network failures. We design, implement and evaluate a SDIMS that (1) leverages Distributed Hash Tables (DHT) to create scalable aggregation trees, (2) provides flexibility through a simple API that lets applications control propagation of reads and writes, (3) provides administrative isolation through simple extensions to current DHT algorithms, and (4) achieves robustness to node and network reconfigurations through lazy reaggregation, on-demand reaggregation, and tunable spatial replication. Through extensive simulations and micro-benchmark experiments, we observe that our system is an order of magnitude more scalable than existing approaches, achieves isolation properties at the cost of modestly increased read latency in comparison to flat DHTs, and gracefully handles failures.

An article by B.J.Hicks (August 2007) entitled “Lean information management: Understanding and eliminating waste” In particular, the paper discusses the application of lean thinking to information management; where information management can be considered to involve adding value to information by virtue of

how it is organized, visualized and represented; and enabling information (value) to flow to the end-user (customer) through the processes of exchange, sharing and collaboration. The potential benefits of lean thinking are discussed and the fundamental barriers for its application to information management are highlighted. These include the need to characterize the nature of waste and establish the five principles of; value, value streams, flow, pull and continuous improvement in the context of information management. It follows that the core contribution of this paper is the development of an understanding of these critical elements and the creation of a conceptual framework for a set of lean principles within the context of information management. This framework offers a unique and arguably generic approach for supporting the retrospective improvement of information management systems and the overall information systems infrastructure.

An article by Juan Zambada, Ricardo Quintero, Ramon Isijara, Ricardo Galeana and Luis Santillan (Oct 2015) entitled “An IoT based scholar bus monitoring system” School transport is used by millions of children worldwide. However, not a substantial effort is done to improve the existing school transport systems. This paper presents the development of an IoT based scholar bus monitoring system. The development of new telematics technologies has enabled the development of various Intelligent Transport Systems. However, these are not presented as ITS services to end users. This paper presents the development of an IoT based scholar bus monitoring system that through localization and speed sensors will allow many stakeholders such as parents, the government, the school and many other authorities to keep real-time track of the scholar bus behavior, resulting in a better controlled scholar bus.

A proposal by REHAN IJAZ entitled “Student Information Management System '' Student Management System is based on the student of UOG. The positive aspect of this system is the data related to the students can be stored for long term purpose and there is no chance of data redundancy or duplication with the use of system. It’s easy to use for everyone no special education or skill needed to operate this system because it is very simple and straight forward system with brief and concise queries which easily understandable for every person.

Article by Dennis McLeod and Dennis Heimbigner entitled “A federated architecture for information management” An approach to the coordinated sharing and interchange of computerized information is described emphasizing partial, controlled sharing among autonomous databases. Office information systems provide a particularly appropriate context for this type of information sharing and exchange. A federated database architecture is described in which a collection of independent database systems is united into a loosely coupled federation in order to share and exchange information. A federation consists of components (of which there may be any number) and a single federal dictionary. The components represent individual users, applications, workstations, or other components in an office information system. The federal dictionary is a specialized component that maintains the topology of the federation and oversees the entry of new components. Each component in the federation controls its interactions with other components by means of an export schema and an import schema. The export schema specifies the information that a component will share with other components, while the import schema specifies the nonlocal information that a component wishes to manipulate. The federated architecture provides mechanisms for sharing data, for sharing transactions (via message types) , for combining information from several components, and for

coordinating activities among autonomous components (via negotiation). A prototype implementation of the federated database mechanism is currently operational on an experimental basis.

## Student Information

An article by Muhammad Asif and John Krogstie (January 2011) entitled “Mobile student information system” A mobile student information system (MSIS) based on mobile computing and context‐aware application concepts can provide more user‐centric information services to students. The purpose of this paper is to describe a system for providing relevent information to students on a mobile platform.

A project by M.A. Norasiah and A. Norhayati (January 2003) “Intelligent student information system” This project is aimed at designing the software to manage the students' academic data such as their status (pass, fail, probation, 'cuti khas', dismiss) so that their GPA and CGPA can be generated. This information is useful for students to plan their academic performance in the next semester. The system will also enable the Head of Programs, the Academic Advisors as well as other faculty's management teams to easily simulate the students' study plan through user friendly menu driven interface forms. The system is designed using Visual Basic Programming and Microsoft Access database program.

A study by Heng-LiYanga and Hsiu-HuaCheng (January 2010) entitled “Creativity of student information system projects: From the perspective of network embeddedness” Many companies have pursued innovation to obtain a competitive edge. Thus, educational reform focuses mainly on training creative students. This study adopted the concept of an affiliated network of projects to investigate how project embeddedness influences project team creativity. This work surveys 60

projects in a Management Information Systems Department of a University. Validity of the specific study hypotheses is tested by using moderate hierarchical regression analysis to determine how project embeddedness affects project team creativity and assess how the team innovation climate moderates the relationships between project embeddedness and project team creativity. Analytical results indicate a positive association between structural embeddedness and project team creativity, a negative relationship between positional embeddedness and project team creativity, and a positive influence of team innovation climate on the relationships between network embeddedness and project team creativity. An attempt is also made to understand the role of positional embeddedness by classifying the interactions based on the content of interactions. According to those results, positional embeddedness is positively related to project team creativity during problem–identification interaction; during solution–design interaction, positional embeddedness is negatively related to project team creativity. Results of this study explain the phenomena of divergent thinking and convergent thinking during creative development.

A study by Amjad Abu Saa, Mostafa Al-Emran and Khaled Shaalan (March

2019) entitled “Mining Student Information System Records to Predict Students’

Academic Performance” Educational Data Mining (EDM) is an emerging field that is

concerned with mining and exploring the useful patterns in educational data. The

main objective of this study is to predict the students’ academic performance based on

a new dataset extracted from a student information system. The dataset was extracted

from a private university in the United Arab of Emirates (UAE). The dataset includes

34 attributes and 56,000 records related to students’ information. The empirical

results indicated that the Random Forest (RF) algorithm was the most appropriate data

mining technique used to predict the students’ academic performance. It is also

revealed that the most important attributes that have a direct effect on the students’

academic performance are belonged to four main categories, namely students’

demographics, student previous performance information, course and instructor

information, and student general information. The evidence from this study would

assist the higher educational institutions by allowing the instructors and students to

identify the weaknesses and factors affecting the students’ performance, and act as an

early warning system for predicting the students’ failures and low academic

performance.

A study by Margaret Gemmell and Rosane Pagano (2003) entitled “A Post-

Implementation Evaluation of a Student Information System in the UK Higher

Education Sector” The dramatic expansion of the higher education sector in the UK

has contributed to a significant increase in competition among organizations within

the sector. Based in the North of England, Salford University is one of the largest

universities in the UK with regards to student numbers and programs of study. The

Student Information System supports the management of student information

throughout key business activities, that is, recruitment, admission, registration,

invoicing, accommodation, assessment, progression, graduation and careers. The

purpose of this study is to perform a user-centered post-implementation evaluation of

this business critical IT system at Salford University.

An article by Zhibing Liu, Huixia Wang and Hui Zan (October 2010) entitled

“Design and Implementation of Student Information Management System”Student Information Management System realization including establishment and maintenance of the database and front-end application development. This paper describes the system functional and architecture design, and emphasizes the system's functionality, database design and functional modules, etc. Fully functional, flexible

and convenient application and friendly interface provide a good guarantee for student information management.

A study by Shilpi Taneja and Anita Goel (January 2015) entitled “A Mobile

App Architecture for Student Information System” This paper proposes a mobile app

architecture that reuses the resources of the existing student information system of

educational institutions. The educational institutions have an existing website that

interacts with a data store to disseminate information to its stakeholders. The data

store and the web resources have been reused for the mobile app. Web services are

developed to fetch information from the data store. The data fetched via web services

is presented via appropriate screens. Design of a complete new application requires a

lot of effort during development and testing, to come up with a stable product. Reuse

of existing infrastructure and software simplifies the task by focusing mainly on the

new features and saves cost, time and effort. A prototype developed for University of

Delhi using the proposed architecture is discussed in detail. The architecture enables

delivery of individualized information to students on their mobile devices which is

accessible anywhere and anytime. This keeps students informed and satisfied. The

architecture can be replicated to design mobile app for any organization having a data

store.

A study by Yu-Fang Tang and Yong-Sheng Zhang (August 2009) entitled

“Design and implementation of college Student Information Management System

based on Web Services” As an example of SIMS (student information management system) developed independently by School of Information Science & Engineering of Shandong Normal University, this paper introduces database design, specific realization of each function module and key technologies used in the system. In the

1. ET environment, using ASP.NET technology, Visual C# and JavaScript as

programming language, this system accesses the database of Microsoft SQL Server 2005 with ADO.NET technology, and could be employed by users with high security following the access control mechanism of RBAC(role-based access control) on Web services.

A article by haftom hailay (June 2013) entitled “Web Based Student Information Management System” 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 will 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 facilitate us 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.

A article by Ajanovski, Vangel (Feb-2013) entitled “Integration of a course

enrolment and class timetable scheduling in a student information system”This work

deals with the most important issues of the two most important university management processes. namely, the process of registering for a semester with course registration and the process of organizing courses and creating conflict-free timetables. The first part of the work introduces the problem and details the effects and interrelationships of the two processes. His second part of the work will focus on the process of timetable planning, analyzing how high the risk of conflicts in timetables is. Timetable discrepancies are rarely introduced due to lack of resources in the normal understanding of terminology, but are mostly related to human resource availability. You will get more detailed information about possible timetable conflicts between courses. The third part of the paper discusses some of the formal complexities of the course registration process and outlines previous efforts to overcome such complexities through the introduction of virtual academic advisors. The Virtual Advisor component is then integrated into the recommendation system to provide each student with personalized course recommendations based on past course and grade data. Finally, a solution is provided in the form of a model that is currently under development. This model assumes an integrated process that covers both previous processes. An integrated process defines an ongoing dialogue between student groups, admissions management and appointment management. The solution is expected to streamline both processes into a fully integrated system and improve student satisfaction with organizational and administrative transparency.

A study by Sura I. MohammedAli, HaithamFarouk,and Hussien Sharaf (July 2022) entitled “A blockchain-based models for student information systems” Blockchain stores a series of transactions in form of a sequence of linked blocks. Hence, the concept of a single decentralized ledger is easily maintained. Transactions and interactions that take place among the participants accessing the distributed and

decentralized but cooperative blockchain network are held through a single ledger. A student information system (SIS) can make use of a decentralized, reliable, and highly trusted ledger that stores vital information. Traditional education systems encounter problems such as centralized record keeping where fault tolerance depends on a single cloud provider; not to mention locally hosted databases. The implementation of blockchain in the education sector provides a new horizon for set of non-functional requirements including but not limited to: security, immutability, independence from the institution, immutability of official records and certificates. In addition, total trust in the accuracy and infallibility are all gathered in the decentralized ledgers of blockchain. The proposed models emphasize on the data availability; represented in students' ability to access all of their data at any time. This paper proposes three models for using blockchains to implement fully functional SIS that maintains transactions such as students’ and faculty members’ records, course registration records and student marks. In addition, avoiding the role of a super administrator or a centralized exposed store where data integrity is vulnerable. Using the proposed models pushes towards an electronic community where genuine certificates can be easily issued and published to the interested parties without the need for involving a centralized administration.

## Synthesis

The researchers have garnered some of the knowledgeable ideas and concepts that are interconnected into organizing and developing the system. These are the basis used to support and conduct the system regarding the "Nagcarlan Scholar Information Management System. One study that helps the researchers to improve their system is the "Scholarship Management System''. Managing the paperwork manually of an organization that handles the scholarships is certainly difficult. Managing all the documents manually is bound to encounter problems in accuracy and organization plus it adds a lot of working time. This study aims to computerize the operation of the available scholarships in college. It proposes a system that has been designed to replace the existing manual operation into a computerized, time efficient and user- friendly system for scholarship. (Tom and Michael, 2018) Another study entitled "Scholarship Management System'' supports this study. It is a web-based information system that is designed to assist the scholarship awarding process at University of Northern Iowa, College of Business Administration. Primary uses of the system include tracking the status of scholars, viewing of data regarding the scholarships and for the new applicants. The systems include the functionality to add, edit and delete any stored data. In addition, it can also generate highly customizable reports when needed. The system also, allows scholarship recipients interactively respond to their awards (Sauser, 2011)

## CHAPTER III

**RESEARCH METHODOLOGY**

The study entitled “Nagcarlan Scholar Information and Management System", was strictly based on the results of a rapid application development. To get the result, the researchers went through a lot of different aspects of procedures and tests. The researchers will discuss the techniques and steps they used to get a desirable and effective study outcome in this chapter.

## Research Design

The researchers will utilize both descriptive and developmental research design in their study. During the preliminary investigation, the researchers used the descriptive research design to collect data in the Municipal of Nagcarlan, Laguna through interviews and observation. By describing the traits of the situations being researched, descriptive research was used to test the hypothesis and provide answers to the subject's or study's questions. This approach also has a distinct and unique evaluation process for more reliable data.

The goal of descriptive research is to accurately and thoroughly describe a population, situation, or phenomenon. It can answer questions about what, where, when, and how, but not why. To describe systematically and accurately the facts and characteristics of a given population or area of interest, according to Helen L. Dulock's article "Research Design: Descriptive Research" (Oct 1, 1993). Give an accurate depiction or account of the characteristics of a specific person, situation, or group. These studies are used to discover new meaning, describe what exists, determine the frequency with which something occurs, and categorize data. To depict the characteristics of individuals, situations, or groups, as well as the frequency with

which specific phenomena occur. These studies observe, describe, and document aspects of a situation as they occur in the natural world.

The developmental research design will be used to evaluate the system's processes and whether the system meets the necessary criteria to be deemed beneficial to the scholars in Nagcarlan, Laguna. The scholars will use and eventually evaluate the system.

## Population of the Study

The population of the study is focused on the local scholars in the Municipality of Nagcarlan, Laguna. An estimated total of 200 scholars.

## Locale of the Study

Based on the preliminary interview with the Head IT of Nagcarlan Municipal Hall, the researchers found out the total number of the scholars in the Municipality of Nagcarlan and their current using manual system process of documents.

The following table shows the respondents below.

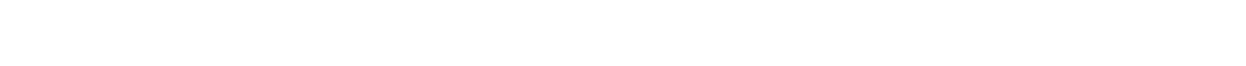
## Table 1. Respondents of the Study

**Respondents Population Sample Size**

Scholars in the Municipality of

Nagcarlan, Laguna 200

## TOTAL 200



***Table 1. Respondents of the Study.*** *The table shows the total target respondents of the researchers to be used to conduct the evaluation for the developed system.*

**Population of the Study**

The population of the study focuses on the Nagcarlan Laguna. The researchers focus on the scholars of the municipality of Nagcarlan. They were picked as respondents due to their willingness to cooperate and based on their desires to improve their processing of information, documents and record management.

## Sampling Design

The sampling methodology used for the study has been chosen as random sampling, which is characterized by an equal chance of selecting each sample. It is intended that a sample picked at random will be a fair reflection of the entire population.

## Interview

The researchers visited the municipality of Nagcarlan. With the communication letter presented to the municipality, the researchers were able to conduct an interview and gather useful information and suggestions from the IT of the municipality of Nagcarlan. This interview has guided the researchers through the Nagcarlan, Laguna Scholars Information and Management System.

# Observation

Observation is another method of gathering data. The researcher, who also took note of the pandemic's present effects on the local environment, observed a few scholar students from the municipality of Nagcarlan. They found answers to the current predicament in their Scholar

Information and Management System, which was based on this. The researchers also acknowledged the shortcomings of their current approach and developed a plan to improve it.

# Online Research and Tech Gap Analysis

A great amount of information is now accessible to Internet users. It has the ability to deliver sufficient information and correct facts. Because so many people publish their studies online, researchers can learn about current systems that are relevant to their research. The researcher can use this to compare features and enhance the system to make it more user-friendly.

## Brainstorming

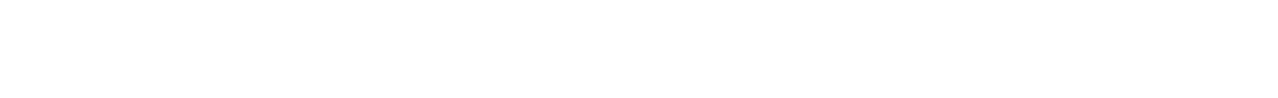
The idea of the system came up from the collaboration of the researcher and some suggestions from the IT of the municipality of Nagcarlan. With the guidance of the thesis adviser and subject specialist, the gathered information has been formed to construct the system to make it more helpful for its users.

# Statistical Treatment

Using statistical methods is one of the most commonly used approaches in scaling response survey research. The Likert Scale is a psychometric scale that is frequently used in survey-based research. Respondents indicate their level of agreement with the statement when answering to a Likert scale item. The researchers used the following scale to show how the computed weighted mean should be interpreted.

## Table 3. Likert Scale

|  |  |  |
| --- | --- | --- |
| **Scale** | **Remarks** | **Verbal Interpretation** |
| 4.20 - 5.00 | SA – Strongly Agree | Highly Acceptable |
| 3.40 - 4.19 | A – Agree | Acceptable |
| 2.60 - 3.39 | MA– Moderately Agree | Moderately Acceptable |
| 1.80 - 2.59 | D – Disagree | Not Acceptable |
| 1.00 - 1.79 | SD –Strongly Disagree | Highly Not Acceptable |



***Table 3. Likert Scale.*** *This will serve as a rating scale for the researchers to measure how respondents feel and how much respondents agreed with the system implementation and evaluation. The researchers used this method because it is one of the most reliable ways to measure opinions, perceptions, and behaviors.*

The Likert Scale Method has its formula:

Where:

R = ((SA\*5) + (A\*4) + (MA\*3) + (D\*2) + (SD\*1))

TNR

**R** = Rating **A** = Agree

**SA** = Strongly Agree **D** = Disagree

**MA** = Moderately Agree **TNR** = Total Number of Respondents

**SD** = Strongly Disagree

## Project Design

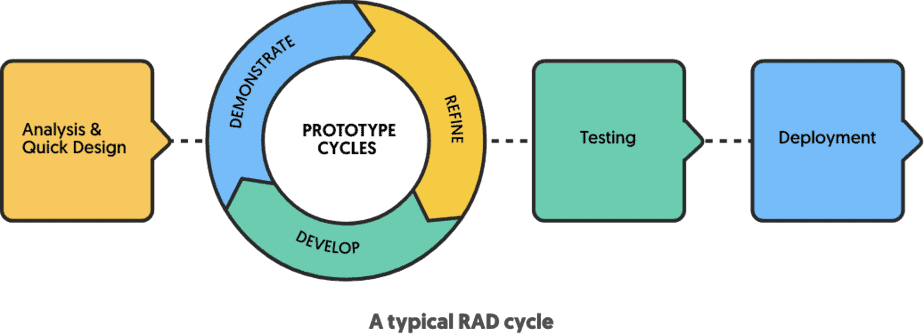
In this part, the software that the researcher used to create the study is discussed. Additionally, it shows how the investigation was conducted. The project design will assist the researchers in determining whether the system will suit the client's needs. The project design will enable the researchers to evaluate the software's effectiveness with respect to the objectives of the study. Due to the project design taking into account the system's functionality and importance, the system's implementation will likewise be more likely to succeed.

# Software Development Model

The researchers will develop the system using the Rapid Application Development (RAD) methodology as the software process model.

This approach to software design relies on iterative prototypes and models, therefore it requires less exact planning. The inflexibility of other conventional software development models, such as the Waterfall model, which made it impossible to implement changes after the first development phase, was generally the motivation behind the creation of this approach. The researchers decided on this strategy so they could swiftly implement a number of software updates and adjustments in response to their clients' needs.

# Rapid Application Development Approach



***Figure 2. Rapid Application Development (RAD).***

*Image Source: Rapid Application Development (Rad). (2020). Retrieved from https://*[*www.wavemaker.com/rapid-application-development-model/*](http://www.wavemaker.com/rapid-application-development-model/)

The figure above shows the methodology that the researchers used in developing the web-based system. It illustrates how the system will be developed.

# Define project requirements

In this phase, the researchers used a variety of data collection approaches to determine the wants and requirements of the clients. First, the researcher traveled to Nagcarlan Municipality and made arrangements to speak with the IT department. After that, the researcher solicited data that could benefit the town and brainstormed with others to develop the suggested study.

# User Design

In this phase, the researcher will present a prototype and will collaborate with their clients and will take an interview until the final system is ready to use. This is to ensure that the client’s wants and needs are met.

# Rapid Construction & Feedback

In this phase, the researcher started with the construction and development of the system. Using HTML5, CSS, JavaScript, Bootstrap, and MySql for the database. In addition to this phase the researcher will also work with their clients and end users to collect feedback on interface, functionality, and user acceptance to improve all aspects of the system.

## Finalize Product/Implementation

This was the last stage of Rapid Application Development. In this phase, the system will be deployed using Heroku. This is where the client will test the functionality of the system.

# Testing and Evaluation Procedure

An IT specialist will assist the researchers in testing and evaluating the system throughout the testing and evaluation phase as they create the system using the Rapid Application Development approach. This will make it easier for the researcher to assess the system's suitability for its intended applications. This will assist in determining the necessary adjustments based on the data the IT specialist suggested.

# Software Testing Phase

The researcher will put functionality of the system through the practical testing. The researcher will contact or request for system testing to an IT expert who has at least three years of expertise in the field and willing to test and evaluate the system effectiveness.

The researchers break down the subsequent processes in order to evaluate the

system’s performance and usefulness, respectively:

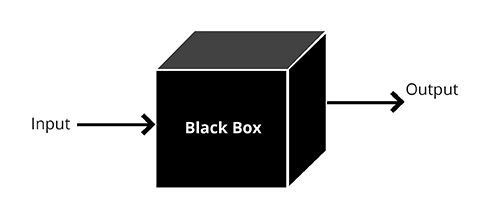
1. Design and creation of a testing tool
2. Testing method

# Design and Creation of Testing tool

A testing tool is necessary in order to evaluate the performance of the created system. The researchers will conduct black box testing to assess the developed system. The IT expert will now evaluate the system's input and output. By testing the system, you can enhance its performance and

functionality, find out what needs to be improved, avoid user misunderstanding, and find mistakes that could cause the system to fail..

It's crucial to test the system to evaluate input, process, and output as well as to spot any potential user problems. This testing can identify user- provided errors and gauge how the system responds to them. Before providing the system to the user, black box testing will be performed to make any necessary alterations based on the needs of the customer



***Figure 3. Black box testing***

*Image Source: Black-box Test Design Techniques https://*[*www.lotus-qa.com/black-box-test-*](http://www.lotus-qa.com/black-box-test-) *design-techniques/. Retrieved August 21, 2022*

## Testing Tool

Black-box testing is a potent testing method and it is a method of software testing that tests the system from beginning to end. Testers can help in imitating user action to check whether the system fulfills its objectives. A black-box test assesses every relevant subsystem along the route, including the UI/UX, Database, Dependencies. This type of testing is to be used by the proponents of the study to ensure user acceptance and to find the problems the proponents failed to see during the development phase.

The researcher will create a series of questions based on the result of a system developed while the system is being tested by the IT expert. Comments and

suggestions will be considered with great interest for the further development of the system. The following table presents a set of activities that should be tested by different types of respondents. They will determine if the system is fit for its intended purpose. This will help the proponent to differentiate the system and also to determine which steps need to be improved and which do not.

**Table 2.** Test Case Description: **Test the Functionality of (Login & ADMIN)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step No.** | **Step Details** | **Expected Result** | **Status** | |
| **Pass** | **Fail** |
| 1 | Input Credentials and click LOGIN | Right credentials:   1. If the credentials are correct the system will redirect to the dashboard of the admin. 2. If the credentials are incorrect the error message will display. |  |  |
| 2 | Dashboard | It shows the announcement page of the admin together with the sidebar of the system.  the sidebar contains:   1. scholar list    1. list    2. pending    3. pending accounts 2. Charts 3. Map 4. Calendar 5. Archive |  |  |
| 3 | View Scholar List | This Page shows all the current list of scholars in Nagcarlan Laguna. |  |  |
| 4 | Search to View | Admin can search for scholar and view their profile |  |  |

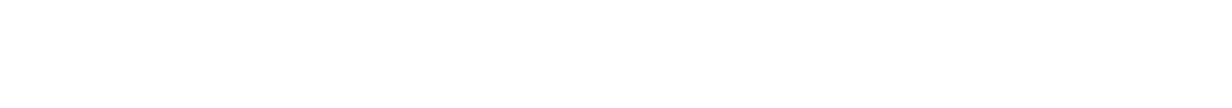
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | scholar Profile |  |  |  |
| 5 | Pending | Admin see all the pending scholarship request of the students of Nagcarlan Laguna |  |  |
| 6 | Pending Accounts | It shows the list of the pending accounts that they can accept or decline. |  |  |
| 7 | Chart | Shows a chart of all the barangay that contains how many scholars there are in every barangay. |  |  |
| 8 | Map | Shows the whole Map of Nagcarlan Laguna |  |  |
| 9 | Calendar | Admin can pin an announcement to the calendar that can be seen by scholars. |  |  |
| 10 | Archive | shows all the scholarship requests that are declined by the admin. |  |  |
| 11 | Chat/Inbox | Shows all the messages sent by the scholars. the admin can reply to scholars messages too. |  |  |
| 12 | Settings | Shows the profile of the admin that can be updated by the admin. |  |  |
| 13 | LOG OUT | Is a function for leaving the account |  |  |

***Table 2*** *shows the testing evaluation of the Admin account of the developed system. It shows the step-by-step of the function and process for the developed system. The results show that all the functions of the developed system are responding properly.*

## Table 3. Test Case Description: Test the Functionality of (Login & Scholars)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step No.** | **Step Details** | **Expected Result** | **Status** | |
| **Pass** | **Fail** |
| 1 | Input Credentials | Right credentials: |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | and click LOGIN | 1. If the credentials are correct the system will redirect to the dashboard of the admin. 2. If the credentials are incorrect the error message will display. |  |  |
| 2 | Home Page | It shows the home page of the system that contains a carousel of pictures of our newly elected mayor. |  |  |
| 3 |  |  |  |  |
| 3 | Upload Requirements | Scholars can upload their requirements on the system.   1. Upload copy of registration form 2. Update student information 3. Voter's ID of Parent/Guardian 4. Voter's ID of Scholar 5. Upload copy of Grades for their 2nd Sem 6. Upload Indigency |  |  |
| 5 | LOG OUT | Is a function for leaving the account |  |  |



***Table 3*** *shows the testing evaluation for Teachers account of the developed system. It shows the step-by-step of the function and process for the developed system. The results show that all the functions of the developed system are responding properly.*

## Software Evaluation Phase

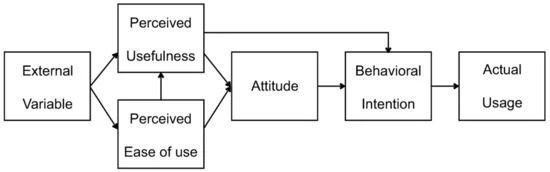
This stage assesses the users' perspective, behavior, and response to the developed web-based system. Obtaining user comments and evaluating their level of satisfaction to assess the research study's applicability to the schools. This stage highlights the crucial elements and the work the

researchers will take from the construction of the evaluation questionnaire to its distribution. The following stages must be done by the researchers in order to determine and assess the technology acceptance of the developed web-based systems:

* 1. The Design and Development of the Evaluation Tool
  2. The Validation of Questionnaire
  3. The Distribution of the Questionnaire

## Design and Development of the Evaluation Tool

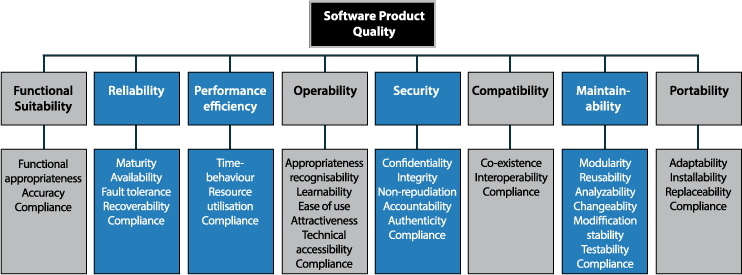
The researchers must construct 3 questionnaires that should be answered by the users of the system: IT experts, IT head of the municipality of nagcarlan and scholars. This questionnaire will serve as an evaluation tool. The questionnaire for the IT head of the municipality of nagcarlan and IT experts will be based on Technology Acceptance Model factors in terms of Quality, Perceived Ease of Use, Perceived Usefulness, Attitude, Behavioral Intention, and Actual Usage.



***Figure 4: Technology Acceptance Model (TAM)***

**Image Source:** Technology Acceptance Model (TAM) by Davis (1989. Retrieved August 21, 2022, from https://[www.mdpi.com/2076-3417/10/22/8299/htm](http://www.mdpi.com/2076-3417/10/22/8299/htm)

The figure above shows the Technology Acceptance Model that the researchers must use to create the evaluation questionnaire. It consists of quality factors, perceived ease of use, perceived usefulness, attitude towards using, behavioral intention to use and experience.



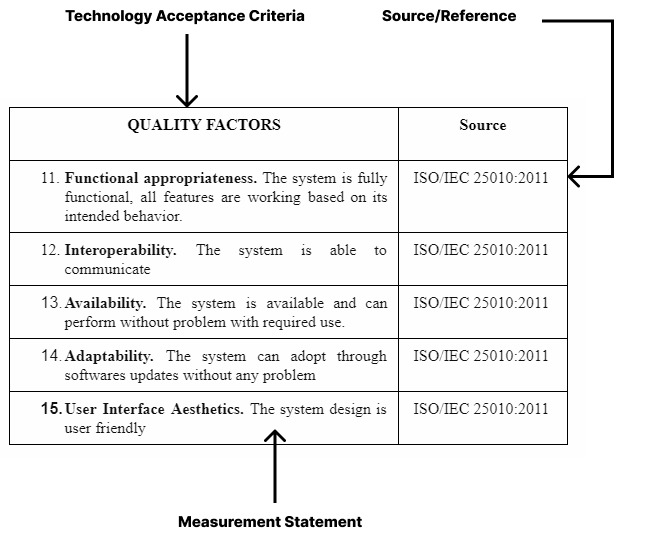
***Figure 5:*** *CISQ.*

***Image Source:*** *ISO 25010. (n.d.). ISO/IEC 25010. Retrieved July 15, 2022, from https://www.it- cisq.org/cisq-supplements-isoiec-25000-series-with-automated-quality-characteristic-measures/*

The figure above shows the ISO/IEC 25010 Software Quality Metrics utilized by the researchers as sub-metrics to the Technology Acceptance Model (TAM) categories in the evaluation questionnaire.

## Evaluation Method

The researchers must construct a questionnaire for user evaluation, consisting of technology acceptance criteria, source and reference, ISO/IEC 25010 quality metrics and measuring statements for the teachers and IT experts. The questionnaires will be validated by the researcher’s research adviser and technical editor before distributing to the target respondents.



***Figure 6. The Structural Format of the Evaluation Tool***

The figure above depicts the evaluation tool that the researcher will use in the evaluation of the study. It includes measuring statements, source/reference, and technological acceptance criteria.

## Validation of Questionnaire

The researchers used Technology Acceptance Model (TAM) as a category and ISO/IEC 25010 quality metrics as a criteria. This will serve as the foundation for the survey questionnaire that the researchers will develop for user evaluation. In order to ensure that the questionnaire is valid for distribution, the research adviser and technical editor will evaluate the questionnaire before the researchers can distribute it to the target respondents for user evaluation.

## Evaluation Tool

The researchers used Technology Acceptance Model (TAM) as a category and ISO/IEC 25010 quality metrics as a criteria for constructing the survey questionnaire. The questionnaires will be handed to the teachers.

The proposed evaluation tool for various users of the developed system is provided in the next page. The table presented shows some set of questions based on TAM criteria, the questionnaire is intended for the teachers. It has 5 sub metrics with corresponding resources.

**Table 5.** TAM Questionnaire for Teachers (Quality Factors)

## QUALITY FACTORS Source

* + 1. **Functional appropriateness.** The system is fully functional, all features are working based on its intended behavior.

ISO/IEC 25010:2011

0. **Interoperability.** The system is able to communicate ISO/IEC

25010:2011

0. **Availability.** The system is available and can perform without problem with required use.

ISO/IEC 25010:2011

0. **Adaptability.** The system can adopt through softwares updates without any problem

ISO/IEC 25010:2011

1. **User Interface Aesthetics.** The system design is user friendly

ISO/IEC 25010:2011

**Table 5:** The table above shows some set of questions based on TAM criteria, the questionnaire is intended for the Teachers. It has 5 sub metrics with corresponding resources.

**Table 6.** TAM Questionnaire for Teachers (Actual use)

## ACTUAL USE

**Source**

1. The developed system is convenient for its user. Abu-Dalbouh, H.

M. (2013)

1. The developed system comfort to the user that the record has security and safe from actual damage

Abu-Dalbouh, H. M. (2013)

1. The developed system user interface enables pleasing and satisfying interaction for the user.

Abu-Dalbouh, H. M. (2013)

**Table 6:** The table above shows actual use with 3 indicators. It consists of actual use criteria based on TAM. Actual use can be measured with these metrics.

**Table 7.** TAM Questionnaire for Teachers (Perceived of usefulness)

## PERCEIVED OF USEFULNESS

**Source**

1. The developed system provides security that only authorized user can access the system

Abu-Dalbouh, H. M. (2013)

1. The developed system assures that the students information recorded on the software can be identified properly their required information
2. The developed system provides security of students information

Abu-Dalbouh, H. M. (2013)

Abu-Dalbouh, H. M. (2013)

**Table 7:** Table shows 3 indicators. These are major features of the system to be measured using TAM criteria based on the usefulness of the system.

**Table 8.** TAM Questionnaire for Teachers (Perceived ease of use)

## PERCEIVED EASE OF USE

**Source**

1. **Learnability.** Learning to use this system is easy for me. ISO/IEC

25010:2011

0. **Operability.** I found it easy to use the system to do what I want it to do.

ISO/IEC 25010:2011

0. **User error protection.** The system provides instructions that guides me especially in filling out information.

ISO/IEC 25010:2011

0. **Functional correctness.** The system provides accurate information in expected output such as sales, profile information etc.

1. **Confidentiality.** The system ensures the security of information that I provided.

ISO/IEC 25010:2011

ISO/IEC 25010:2011

**Table 8:** The table above shows 5 indicators for perceived use. This is to

be evaluated by the teachers.

**Table 9.** TAM Questionnaire for Teachers (Behavioral intention)

## BEHAVIORAL INTENTION

**Source**

1. The developed system provides ease of use for the user in utilize new technology

Abu-Dalbouh, H. M. (2013)

1. The developed system comfort to the user that the record has security and safe from actual damage

Abu-Dalbouh, H. M. (2013)

**Table 9:** The table above shows behavioral intention using the system. It has 2 indicators involving major features of the system.

**Table 10.** TAM Questionnaire for IT Experts (Quality of the system)

## QUALITY OF THE SYSTEM

**Source**

1. **Functional Completeness.** The system meets the required functionalities

ISO/IEC 25010:2011

0. **Fault Tolerance.** The system continue to operate despite presence of faulty hardware and software faults

ISO/IEC 25010:2011

0. **Integrity.** The system does not allow unauthorized login. ISO/IEC

25010:2011

0. **Testability.** The system can be tested for efficiency and effectiveness.

ISO/IEC 25010:2011

1. **User error protection.** The system can handle errors with appropriate responses to the user.

ISO/IEC 25010:2011

**Table 10:** The table above shows the set of questions for IT experts to test the system with the following criteria. It consists of 5 indicators under TAM criteria.

**Table 11.** TAM Questionnaire for IT Experts (Perceived ease of use)

## PERCEIVED EASE OF USE

**Source**

1. **Learnability.** The system has comprehensive and clear instructions to guide the users.

ISO/IEC 25010:2011

0. **Operability.** The functions of buttons are working as intended as well as the labeling of the controls.

ISO/IEC 25010:2011

0. **User error protection.** The system does not allow invalid inputs and includes restriction of pages so that unauthorized login will be avoided.

1. **Confidentiality.** The system ensures the security of information and the passwords in the database are encrypted.

ISO/IEC 25010:2011

ISO/IEC 25010:2011

**Table 11:** The table above shows a set of guidelines for the testers to evaluate the system. This is under the TAM criteria and based on ISO/IEC guidelines.

**Table 12.** TAM Questionnaire for IT Experts (User satisfaction)

## USER SATISFACTION

**Source**

1. The user must be satisfied with the services of the system.

Guritno, S., & Siringoringo, H. (2013)

0. Users must be confident in using the system. Must respond accurately to the user's requests.

Guritno, S., & Siringoringo, H. (2013)

0. Users must trust the system so that it can contribute to their school progress.

Guritno, S., & Siringoringo, H. (2013)

**Table 12:** The above table shows user satisfaction criteria. It consists of 5 indicators along with its source.