REACT (RESEARCH ACTIVITY TRACKER): AN INNOVATIVE TOOL FOR TRACKING AND MONITORING BATSTATEU FACULTY RESEARCH PERFORMANCE

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REACT (RESEARCH ACTIVITY TRACKER): AN INNOVATIVE TOOL FOR TRACKING AND MONITORING BATSTATEU FACULTY RESEARCH PERFORMANCE

A Capstone Project

presented to

the Faculty Committee of the College of Informatics and Computing Sciences

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The National Engineering University

ARASOF-Nasugbu Campus

In partial fulfillment

of the requirements of the degree

Bachelor of Science in Information Technology

Network Technology Track

by

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DEDICATION

This work is solemnly dedicated to our Almighty God who gave us strength and faith to finish this requirement and blessed us in every moment of our life, to our beloved parents, who supported us morally, spiritually and financially, to our capstone project adviser who motivated us to do our best and to accomplish our tasks, to our professors who gave advice and supported us, and to our friends who continually gave us encouragement during the completion of this work.

CERTIFICATE OF COMMITTEE APPROVAL

In partial fulfilment of the requirements for the degree **Bachelor of Science in Information Technology**, this capstone project entitled **"Roadside Assistance System (ReS-Queue): A Roadside Assistance Solution for Vehicle Merchandise and Repair Shops in Nasugbu, Batangas"**, has been prepared and submitted by **John Patrick L. Limon, Ronel R. Casilag** and **Mergielyn S. Arimuhanan,** is recommended for oral examination.

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Abstract

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One of the major problems encountered by most vehicle owners is roadside emergencies such as flat tire. Although, there are existing nearby repair shops and vehicle merchandise in the area that offer vehicle parts, accessories and vehicle services, people are still unaware of the products and services they offer because only a few of them can be easily located, and none can be found through a navigation application. Hence, this research sought to create a system that would help users to locate nearby vehicle merchandise and repair shops around an area. The researchers used the Agile methodology in order for them to perform any iterations as they could until they reached the set requirements. Furthermore, essential data were collected to inspect how the majority of businesses operate and work. To ensure efficiency, the accuracy of the location in the map feature of the developed system was evaluated while the respondents share their perspective on the issues and challenges encountered by the: Department of Trade and Industry (DTI); shop owners and vehicle owners; and the level of satisfaction of the users. The results of the study evidently show a positive outcome and the expectations for the developed application were met with a 4.73 mean rate for the level of satisfaction and acceptance. Recognizing the capability of the system to perform their features, the researchers' recommend that the DTI, shop owners, and vehicle owners, consider the use of the application for easier and hassle-free travels.

Keywords: *Navigation Application, Agile Methodology, Locate*

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

THE PROBLEM AND ITS BACKGROUND

INTRODUCTION

Research is the foundation of human progress, driving us to solve complex problems, discover the mysteries of our world, and prepare pathways for a more promising future. It is a manifestation of the natural curiosity and continuous search for knowledge that have guided civilizations across the globe over the centuries. It reveals new viewpoints, widens our horizons, and questions accepted standards through methodical investigation, meticulous examination, and the use of critical thought. It is crucial for advancing human knowledge, progress and it supports informed decision-making, promotes innovation, and broadens the boundaries of knowledge in all fields. This establishes the framework for the investigation of a particular research topic while highlighting the crucial role that research plays in revealing truths, answering questions, ultimately forming our collective understanding, and advancing society. Research is important in every university especially in terms of the faculty performance regarding to research, monitoring, and managing of research projects are crucial to enhance faculty performance in the University.

Monitoring and managing performance and activities helps to increase faculty productivity and engagement. It supports and improves the work of coordinators both individually and in teams, which aids in the improvement of the institution. Also, it allows establishing a structure for coordinators to keep track and review the institution's priorities and objectives. Priorities enable the institution to have a flexible, resilient culture. Institution needs to adapt in order to survive. Depending on the industry and the times, varying amounts of change may be required (Margolis).

Changes and adapting innovative method help to survive in different times in terms of solving problems that aids in the generation of original solutions to issues that we might not have been able to resolve through the use of traditional method, increase efficiency that make our work more effective, saving time and resources, creating new opportunities such as discover new ways for monetizing our knowledge and skills also being competitive so that we can continue to be successful and relevant by continuously improving and adapting. Innovation is an operation by which a domain, product, or service is extended and produced up to date by applying new processes, initiate new techniques, or determine successful ideas to construct new value (Innolytic). Organizations can boost efficiency and productivity as well as open new opportunity for innovation by utilizing different technologies.

Technology is having advanced development which information technology is used extensively. More businesses are relying on performance in the management process, management information to increase productivity and efficiency, improving the management approach, hastens organizational development. Technology is the primary key in solving the world's problem and it has revolutionized in different ways of doing things, ways that improve the life of humans and advanced industries (Ford et al.). Using advanced network application and technology by implementing a powerful innovative tool that can solve performance issues of the Research Office in Batangas State University.

Batangas State University has lots of Faculty Researchers on different campuses and everyone has important roles, projects to work on and lots of activities to manage daily. Faculty faced different issues and challenges in regards with the monitoring, consolidating, and storing of data regarding research activities which we must resolve for the effective progress of the important requirements of the Research Office. The Faculty Researchers are responsible for managing and monitoring their research activities while the Research Unit of the University is responsible for monitoring the research requirements processes. They help to ensure and track the progress of each Faculty Member regarding their research activities and accomplishments to anticipate issues.

The Researchers conducted an interview with the Head of Research and Vice Chancellor for Research Development and Extension Services (VCRDES) of Batangas State University the National Engineering University ARASOF-Nasugbu Campus. They are responsible for monitoring the accomplishment, achievements, and engagement of the faculty regarding to research. Based on the interview and consultation, the following are the most common issues and challenges encountered by the Head of Research and VCRDES; a) there is no standard platform or application used in managing and monitoring of research activities; b) collection of R&D related document are done via Email, Facebook messenger, Google sheets and Google Drive; c) lack of centralized repository which there is no system where research records are kept and maintained; d) delay of consolidation of reports; and e) there is no program or system that would encourage researchers to participate in the university research activities; To effectively address these issues and challenges encountered by the Research Unit of the University, the Researchers developed a system entitled ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance.

ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance would automate and improve relevant operational processes of Research Unit in Batangas State University. It would serve as a tool in providing the users with reliable data to manage, track and

monitor the research activities effectively and efficiently in mechanized system. The study is mainly focused on managing, tracking, monitoring, and improving faculty performance on different operations and activities related to research. Furthermore, the developed system can easily keep track of faculty engagement in research, and it would enable Faculty Researchers to conveniently access and manage their research projects, track their progress and accomplishments. Also, it would provide real-time data analytics to monitor the progress and outputs of the faculty researchers, which is beneficial to the Research Unit of the University in decision making process.

Background and Settings of the Study

Research accomplishments tracking is the management activity through which an institution ensures that its staff are working effectively and efficiently. In the case of BatStateU Research Office, they are facing difficulties when it comes to monitoring, consolidating, and storing of different research activities and accomplishments, such as the progress of different research that the faculty work on, technical CV profiling, achievements, and different reports. As for the Research Unit of Batangas State University they should know whether the specific research team has reached the performance task that the institution has considered desirable or not.

To address the issue of monitoring, consolidating, and storing of research activities, collection of data was conducted via different platforms for years, such as Email, Google sheets, Google Sites that would be link to Google drive and different necessary soft copies. Despite the use of the said platforms, there is still a gap to these processes.

In collaboration with this study with the Research Unit of the University, and different Faculty Researchers

to provide assessment on the desired system solution. Taking into account of different challenges of the BatStateU Research Office current situation, such as unorganized google sites, lack of immediate data, and centralized repository, in which may be called for an effective added features for monitoring, consolidating and storing system. Therefore, there is a need for an effective system to maximize the institutions' processes.

In view of the processes of monitoring the accomplishments, achievements and engagement of the faculty, the Researcher develops the ReAcT to aid different issues on monitoring and improving of research performance of the Faculty in Batangas State University. This system may improve the efficiency and effectiveness of research administration, promote collaboration among faculty

researchers, and improve the visibility and impact of the institution's research activities.

STATEMENT OF THE PROBLEM

The study aimed to developed ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance.

Specifically, the study sought to answer the following question:

1. What is the system usability assessment of the respondents on the developed system using the end user satisfaction questionnaire?
2. What is the level of acceptability of the respondents on the developed system in terms of:
    2.1. Efficiency;
    2.2. Functionality;
    2.3. Reliability;
    2.4. Usability; and
    2.5. Security?
3. What is the level of satisfaction of the Vice Chancellor for Research Development and Extension Services (VCRDES), Head of Research,

College Dean/Associate Dean and College Research Coordinators on the features of the developed system in terms of:

3.1. Dashboard;

3.2. Research Projects Monitoring; and

3.3. Report Generation?

SIGNIFICANCE OF THE STUDY

The Research Office used the manual process of managing, tracking, and monitoring their research activities and performance. This most of the time results in problems related to documents handling/archiving, real-time monitoring, tracking and poor management of research activities. As technology emerges and advances, these problems are now easily resolved.

The developed system may be beneficial to the following:

Batangas State University. The findings of this study can promote effective engagement of the university in regards to research activities and it would improve their faculty transaction regarding the collection and immediate source of data.

College Research Coordinators. The developed system would provide solutions to the problems pertaining to the management and monitoring of research activities. The search and retrieval of documents or information would also be easy.

Faculty. The aim of the study would be to provide databases for the immediate source of data in regard to the publication or paper in the faculty.

Future Researchers. The study may serve as their guide or reference in conducting their related study and for further improvement of the project.

Research Unit of the University. The Research Activity Tracker can assist them in monitoring the accomplishments, achievements, and engagement of the faculty in research. Also, it helps them in providing feedback and support to their faculty researchers as needed.

SCOPE AND LIMITATION OF THE STUDY

This study focuses on the development of research activity tracking and optimizing faculty research performance. The major processes on which the system is focused on the following: (a) Dashboard, (b) Research Projects Monitoring, and (c) Report Generation.

The main feature of the developed system is the Report Generation Module which can display beneficial reports for tracking processes including the Dashboard, Research Projects Tracking and Monitoring. It enables respondents to monitor and examine such research faculty participation and activities in few clicks.

To effectively track the availability and systematizing of data, the developed system provides immediate source of data for the Research Unit of the University with an organize high – level overview of the information or state of involvement of each faculty to research and its research activities in their respective sectors. This feature facilitates greater tracking and monitoring process.

The developed system automates the usage of different platforms when it comes to daily management, tracking and monitoring of activities and involvement of faculty to research, the developed system provides comprehensive web-based system wherein faculty do not have to manage various data across various mediums. The system eliminates the usage of sparse data collection. The developed system would help boost faculty engagement. Another feature that the developed system includes, allowing the Batangas State University Research Unit to store and take control of the necessary data in the cloud, whether to upload, download or delete the uploaded data. It manages the files stored in the cloud (such as Approved Research Proposal, Technical CV, Accomplished Research, Certificates, and other Research Activities). With this the developed system provides appropriate storage to the institution. In addition, the system provides inclusion of designated area for certificates or awards attachment that gives encouragement and motivation for faculty to strive for more research accomplishments and participate on different research activities of the institution, as it improves determination to the faculty.

In addition to the report generation part of the developed system, the following modules are incorporated to simplify the operations in the institution: account module, monitoring module, and target module.

The Account Module would be divided into its different users of Batangas State University Research Unit and Faculty Researchers. This module would be divided into groups of accounts with its privileges, accounts is categorized by the (1) System administrator that manages accounts of the user (2) VCRDES, Head of Research and College Dean/Associate Dean account, this part also includes monitoring all research activities and the involvement of faculty in research (3) College Research Coordinator, this part includes consolidation, monitoring of faculty research activities and research performance and the only one that can verify created accounts of the faculty (4) Faculty Researcher account, this part is where the researchers update onto activities and involvement to the research. Different accounts vary on the data they would monitor.

The Monitoring Module involves monitoring whether a faculty meets the research completion and research status or improvements. The Research Unit of the University and Faculty Researchers manage the execution of these transactions.

The Target Module has the ability to display the target number of research activities versus the number of accomplished research activities that is track in a

semester basis. This activity is managed and viewed by the Research Unit of the University.

The Report Generation Module includes tracking faculty's actual research accomplishments or status and filtering on a quarterly and annually basis through dashboard as well as research activities are being convertible and downloadable through PDF files. Overview of data in this feature enables users to examine data at ease.

The study would only support the management, tracking, monitoring, submission, and project evaluation of different research activities of the faculty in Batangas State University the National Engineering University ARASOF-Nasugbu Campus but would not focus on the University Wide research project evaluation.

DEFINITION OF TERMS

For a better understanding of the study, the following terms are defined in the context of this research.

Analytics. refers to the process of identifying, explaining, and sharing important data trends which helps to monitor the progress and output of the faculty researchers.

Cloud. refers to the computer system resources, especially in terms of storing, which we can easily handling/archiving different data that is available when needed.

Dashboard. refers to the system's feature that can monitor the faculty research performance and activities that are constantly changing and might require attention and response at a moment's notice.

College Dean/Associate Dean. refers to a person responsible for monitoring all research activities and the involvement of faculty in research.

Faculty. refers to the person who conducted or is involved in research activities that would be evaluated using a web-based system.

Head of Research. refers to the person that is responsible for monitoring the accomplishments, achievements, and engagement of the faculty in regard to research.

Monitoring. refers to periodic tracking like quarterly and annually for any activity's progress by systematically gathering and analyzing data and faculty information about research performance.

R&D. stands for Research and Development which is the related documents such as certificates of awards, seminar, acceptance, and conference proceeding.

ReAcT (Research Activity Tracker). refers to the call on our research title. This Research Activity Tracker is to keep track of faculty engagement in research, and it would enable faculty researchers to conveniently access and manage their research projects, track their progress and accomplishments, and meet the university targets.

Real-time Data. refers to the data that is presented as it is acquired and updated in specific time.

College Research Coordinators. refers to the person who prepares all the required documents in the research and keeps track of the institution's priorities and objectives.

Research Office. refers to the unit where monitoring and consolidation of research activities are being tracked which they improve processes that make them reach their objectives.

System Administrator. refers to the person who is the only one that can verify created accounts and manage accounts in the developed system.

Tracking System. refers to track performance and allows users to complete and keep track of performance reviews.

VCRDES. an acronym stands for Vice Chancellor for Research, Development, and Extension Services, a position at Batangas State University responsible for

overseeing and managing research, development, and extension programs and activities.

Web-Based. refers to any software that is used over a network connection using HTTP, as opposed to being stored in a device's memory, is referred to by this phrase. Web-Based often runs inside a web browser.

CHAPTER II

RELATED LITERATURE AND STUDIES

This chapter discussed the related literature that the researchers used as a foundation and reference for their research. The conceptual literature, related literature, technical background, theoretical framework, conceptual framework, and synthesis are all included in the study.

CONCEPTUAL LITERATURE

Following reviews cover the concepts on Current Research Information System, Decision Support System, and Management Information System.

Current Research Information System (CRIS)

Conforming to Elsevier "Managing research data across your university without a system is impractical". As for Current Research Information System, it stores pivotal related data for analysis, reporting, and research promotion activities. Research Information Management Activities become more efficient and effective by integrating and connecting various processes that form the research ecosystem. CRIS centrally stores related data for a.) Analysis b.) Reporting c.) Research showcasing and communication; and d.) Managing information in one place through one interface. The existence of this centralized data and interface promotes

the following: a.) Research performance b.) Global reputation c.) International collaboration d.) Funding.

Jettena et al. conducted a case study about the role of CRIS's in the research life cycle at Radboud University (Nijmegen, the Netherlands). This study offers a one-stop-shop interface for the researchers that has its functionalities allowing researchers to register and upload files, and along with it is the registration of publications, uploading of full text to the university's repository, linking of datasets and publications and the creation of researcher's profile (CV) pages.

Decision Support System (DSS)

According to CFI Team, DSS is an Information System (IS) that aids a business in decision-making activities that needs judgement, determination, and a series of actions. DSS is either human-powered, automated, or a combination of both. They also state that in an organization, specifically; planning departments a DSS is used such as the operation department to collect data and creates a report that would benefit managers for better decision-making and automates repetitive managerial processes.

According to Damar's research, higher education, like any other sector, must use technological tools to enhance communication and information technology. For management and monitoring of scientific research and its effectiveness, Iran and

Turkey throughout the years of 2010 and 2020 were identified that both had not developed and shared an application. By paying attention on scientific collaboration between the mentioned countries, a decision support system emerged. Taking into account for the scientific production, policy makers, and administrators DSS helps to expand collaboration.

Management Information System (MIS)

Baharun conducted a case study at Nurul Jadid University, India. The study highlights the need to leverage e-public relations facilitated by Management Information System (MIS) in order to garner positive public opinion and foster the institution's competitiveness, the researcher seeks to describe and analyze the significance / importance of MIS through interviews, observation participation, documentation, and focus group discussions. This study proves it has a beneficial influence since it provides quick information and communication through the establishment of their official university website and the optimization of the role of current social media.

RESEARCH LITERATURE

The following studies are considered to be reviewed because they contained findings that were relevant to the researcher’s study.

Monitoring is the systematic collection of data on a given activity. To track daily activities, observation, recording, and processing activities are monitoring aspects that collect information in a project or program and evaluate if certain tasks are progressing while also having goal observations. Another aspect of monitoring is providing feedback on the project's progress to sponsors, project implementers, and project beneficiaries. Feedback through reporting allows the information gathered to be used in decision-making for efficient project execution. The online day-to-day monitoring system significantly enhances the university's existing manual approach as it is more convenient, it is online, and assist authorize users for checking day-to-day monitoring of reports and improves on-time submission of activities (Balmes).

In the study of (Mleke, Dida) states that implementation of monitoring tool will empower the ministry of health to effectively monitor project activities and removes risk associated with traditional paper-based data collection that results to more efficient project management.

A community college in the northern part of Mindanao was given a Management Information System to utilized variety of reasons such as data management and report generation that aid school decision-making for current and future innovations (Grepon et al.) Findings shows that implementing centralized system in storing, processing and retrieval of information of their school-related transactions has benefitted the institution.

While, a study by (Casillano et al.) tracks down faculty performance that were determined through their IPCR. From 2017 to 2019, faculty members' ability to complete their research projects and hit their goals was continuously assessed as "poor" by the mean scores in the conducted hypothesis testing for research. None the less, negative variance was frequently observed during this period and indicate a decreased of productivity in which can be attributed to a variety of issues including lack of time for extension and research, loss of financial support, and lack of community participation. the poor variances in faculty research performance draw attention to a significant problem, but they also present a chance to carry out pertinent tasks and initiatives that would improve faculty research performance.

As a faculty it is expected for them to generate knowledge through their research and disseminate it through conferences and journal publications. As for the Philippines, number of publications from higher education are consistently limited (Wa-Mbaleka). The study focuses on three institution and each faculty members had to write individually and privately on an index card answering one question that would determine different factors affecting research publications of HEI.

Similarly, Cebu Technological University (CTU)-Moalboal Campus assessed and determined findings of the research capability of faculty members and provides tool on how to address the issues and challenges that affects the completion and

publication of the research of faculties through a research clinic program that helps to improve publications (Perez et al.).

Another study from (Podolyanchuk) says that one of the important components for able the university to function is the research activity. Alongside the research activities is the research activity monitoring system that implements the control function, one of the most crucial management functions that provides feedback. Providing feedback can therefore save time for structural unit managers and creates comfortable conditions for management activities and can help solve organizational issues.

Providing quality research can be related on quality teaching, base on the study of (Cadez et al.) systems that reward outstanding research are consistent with the ideals of promoting high-quality education. The fundamental assumption is that persons who are motivated to excel and make significant contributions to research are likely to display the same level of passion and success in their teaching roles.

A study by (Abrugena, Ramos) optimizes research centers' paper submission processing, management, gathering, and tracking with the use of university research production and utilization management system, paper information can electronically receive, tracked, kept, and distributed via developed website. Consolidation of research data are made easier through the web-based system.

Visualizing research activity using data visualization techniques is implemented to the study at the University of Thessaly as it provides pictorial or graphical representation of abstract data and helps people recognize patterns within the large volume of data. Also, its objective is to design and execute a web based IS for propagating and monitoring the research activities of an institution. With the help of the developed system, each department can access real time important information concerning research activity such as charts to visualize number of citations (Foti et al.).

Another research utilizes data visualization that provides a report of faculty data. One of the most popular forms of data visualization is dashboard as they effectively present a summary of important information and compile data from multiple sources that the faculty members can identify immediately. It also provides a display of high-level information on a single screen (Munford).

TECHNICAL BACKGROUND

The researchers acquired relevant data from the Head of Research and Vice Chancellor for Research Development and Extension Services (VCRDES) in Batangas State University TNEU ARASOF-Nasugbu Campus in regard to the preceding concerns. The researchers initiated a collaboration of ideas to consider the technologies that would be engaged in the web-based tracking tool for the

research performance and activities; hence, the researchers identified the technology, tools and software that can be use in a tracking system.

This study was conducted to help the Research Office to easily monitor the research activities and faculty performance, to help them give immediate source of data when needed and to have a proper centralized repository. The researcher's project is an IT-related study. The tools and technical terms used by the researchers in the developed study entitled ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance are the following:

HTML or Hypertext Markup Language is the programming language applied to create monitoring web pages for the end users. It consists of links which are connected in webpages to one another that retrieve content which is presented on the page and having series of elements that tell the browser how to display the content (w3schools.com). HTML is used as a guide for constructing the design of the webpage by arranging text, images, and colors in a specific way, some tags are used to create the overall page layout and elements of a webpage. To create a unique style that can be linked to an external file or the main HTML file, tags may contain attributes. These attributes have values that can be used to change how a webpage is designed (developer.mozilla.org).

CSS or Cascading Style Sheets is a language used to describe how an HTML.

document is presented. It is employed to style and arrange web pages, such as changing the font, color, size, and spacing of your content, dividing it into several columns, or including animations and other adornments. The styling text, which is one of the most frequent things you would do with the language. Here, we examine the fundamentals of text styling, such as how to set the font, boldness, italics, line, and letter spacing, drop shadows, and other text features also it is suitable of creating the layout of a webpage by adding animation effects, adding responsive features and for ideal designing (w3schools.com). For the researchers, the main purpose of using CSS is to create an efficient method of designing and to create a more ideal design and having a user-friendly interface for the end users.

JavaScript is an object-oriented scripting language used to make webpages interactive. To connect with the web server, researcher use PHP which focused on server-side by perform queries which it would create, read, update, and delete (developer.mozilla.org). The function in the system is to create entries for data, read to retrieve data and display the results, to update altering data, and delete values in the database.

Bootstrap is a free front-end framework which includes HTML and CSS based designing template for buttons, tables, navigation, modals, image, and such (w3schools.com). It gives the researcher the ability to easily create responsive design.

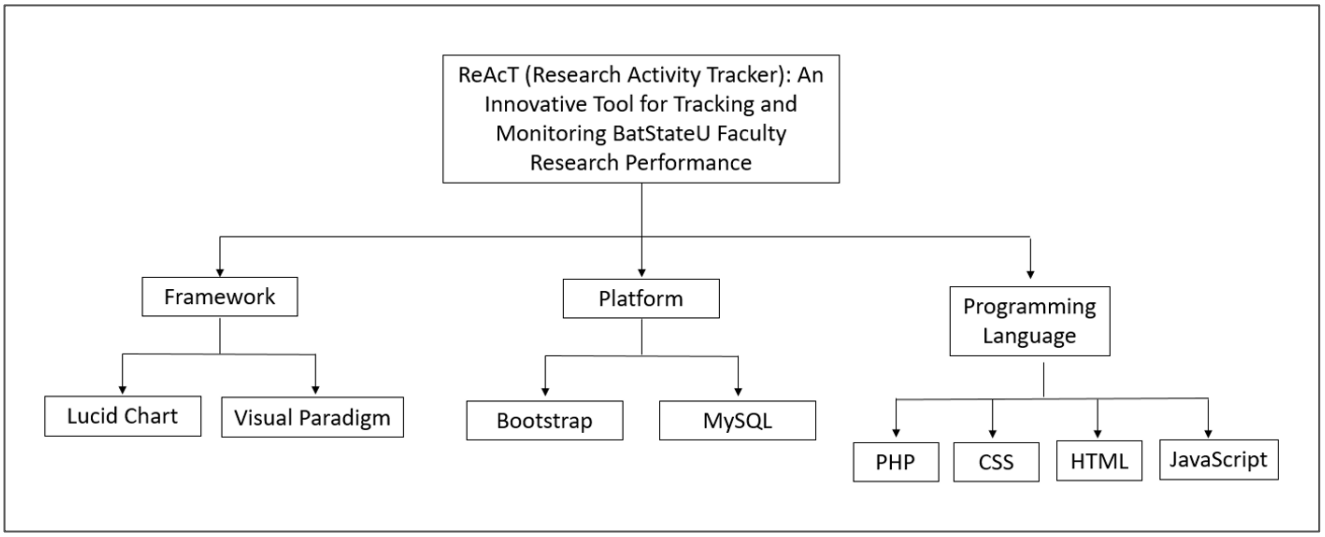
XAMPP for the web server it can test the system even without an internet connection. Researchers used the well-known database MySQL, along with PhpMyAdmin to manage it and to build a relational database system. The Apache HTTP web server was used as the web server software. Sublime is used to code the scripts for the creation of the system. In addition, a Lucid Chart and Visual Paradigm was used for establishing charts and diagram in creating the Work Breakdown Structure (WBS) of the project.

Cloud Storage is a service model where data is sent and stored on remote storage systems, where it is maintained, managed, backed up, and made accessible to users over a network, usually the internet (Chai et al.). The researcher would be using a public cloud provider, either Azure or GCP, Batangas State University can benefit from the provider's extensive infrastructure and security measures, making it easier to ensure that Research Activity Tracker is secure and available. It can provide almost unlimited scalability, allowing Research Activity Tracker to handle increased traffic and usage without requiring significant infrastructure upgrades.

THEORETICAL FRAMEWORK

Figure 2.1 Theoretical Framework

Figure 2.1 exhibits the theoretical framework of the developed system ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance, which comprises 3 phases. Under the framework the proponent would use Lucid Chart, and Visual Paradigm. The following phases are the platform containing Node.js and MySQL for the creation of this web-based developed system and the programming language is used as a tool for development of the system.



CONCEPTUAL FRAMEWORK

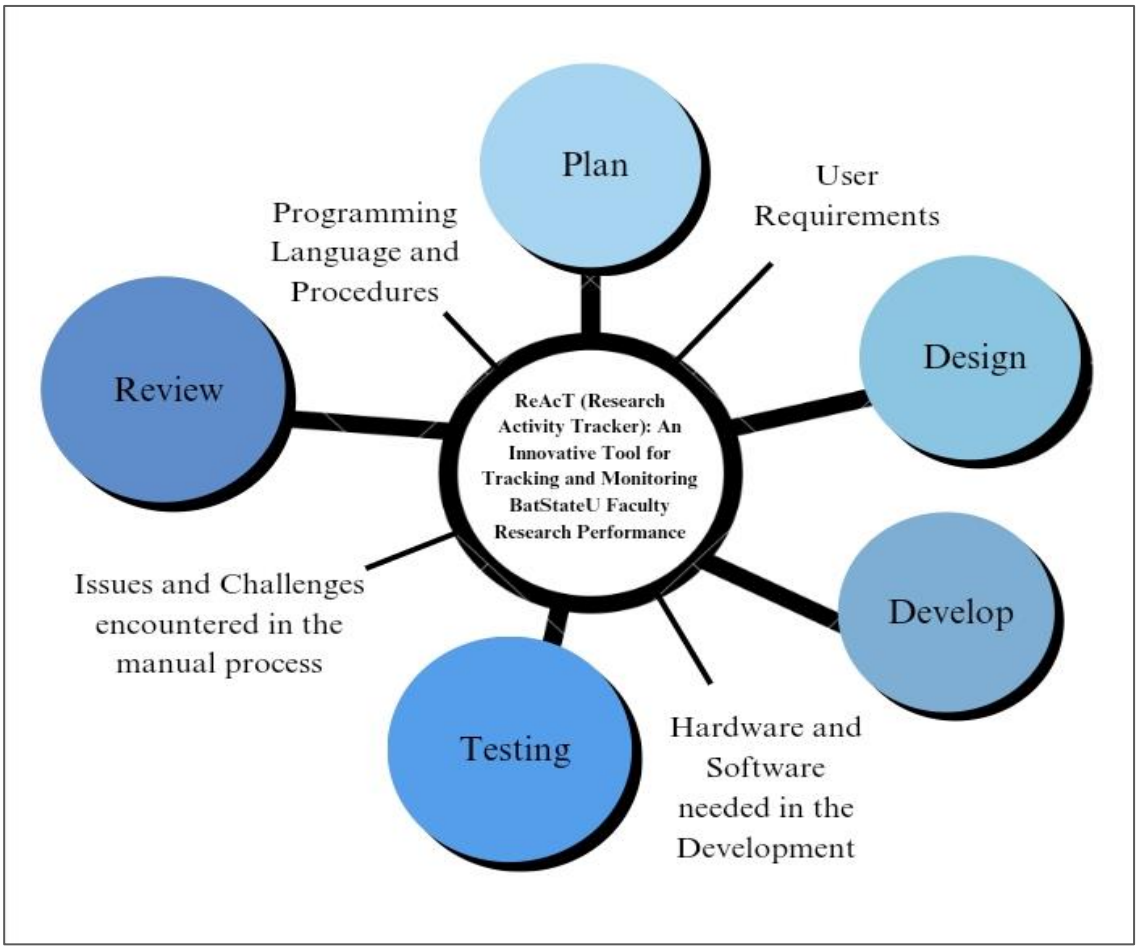


Figure 2.2 Conceptual Framework

Figure 2.2 shows how the information was processed to achieve the desired output of the developed system. The developed study is intended to improve the manual monitoring process of faculty research activities and research performance in Batangas State University the National Engineering University ARASOF-Nasugbu Campus. The study included the information needs of the end-users, issues and challenges encountered in the manual system, programming language and

procedure to be used, also the hardware and software needed in the system development. Then, Agile Methodology would take place in order to formulate and develop solutions to address the said issues and challenges. The output was ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance.

SYNTHESIS

Different local and foreign studies gathered from other researchers that are reviewed above are relevant to the current study as they serve as the foundation for the development of the web-based monitoring system.

The study of Balmes entitled "Online Day to Day Monitoring System for Lyceum of the Philippines University" aimed to develop an online day to day monitoring system to help the faculty as well as the college dean on their daily monitoring of faculty members' activities and generation of reports. Their intended users can access the system anytime because they made a web program, and it is accessible online. Like the developed system of the researchers, it also provides a web-based system that generates reports. However, their monitoring system is for the two of their colleges only.

The developed system of Grepon et al. for the community college in the northern part of Mindanao is similar to the present study of the researchers in terms of

providing web-based system, report generation and centralized data storage system to the institution, the previous study and the developed study differ when it comes to what they track since the study of Grepon et al. focuses on monitoring and processing transactions such as Subject control, Enrollment, Assessment, and printing of reports.

The concept of the study of Casillano et al. is to determine the difference of faculty performance in research, instruction, and extension with their Individual Performance Commitment Review (IPCR). Since it is the mandate of each faculty member to perform in research, instruction, extension, and production. This study is similar to the developed study of the researcher to track faculty research performance. However, there is no system created on the study of Casillano et al.

The study of Wa-Mbaleka determine factors affecting research publications among Higher Education Institution and provide different solutions, as well as the study of Perez et al. it provides tool to solve issues and challenges on faculty's research publication through research management plan. Both studies aimed to improve the research culture of the institution. In similar to the ReAcT system it provides solution to improve faculty research performance, but the study of Wa-Mbaleka doesn't furnished any system.

The developed system of Abrugena and Ramos for Lyceum of the Philippines University – Batangas, a research proposal submission management system is similar to the developed system in terms of monitoring, keeping and distributing information online with the web-based system. However, their developed system lacks a dashboard unlike the researchers developed system.

The study of Podolyanchuk was related to the developed study of the researcher since it monitors faculties and departments research activity. However, the study of Podolyanchuk does not have a web-based system and their database was generated and analyzed in Excel, the results of their study were presented in both tabular and graphical format.

The Implementation of Data Visualization in the study of Foti et al. at the University of Thessaly executed a web based IS for monitoring research activities of an institution is similar to the developed study of the researcher. ReAcT provides real-time monitoring of information and it also generates data visualization in the form of dashboard.

The developed system of Munford designed prototypes for performance analytics dashboard to its users that present a summary of important information. Different levels of dashboard customization are integrated for their institution such as: 1. Customization for different roles 2. Customization for different

department/schools 3. Customization for individual level 4. Customization for different user-groups. The study was similar to the researcher's study as the developed study integrate dashboard for the end users.

CHAPTER III

DESIGN AND METHODOLOGY

This chapter discussed the methodology of the research showing all the processes and information that have representation of diagrams, figures, and requirements for the development of the system.

Research Design and Methods Used

The researchers used a descriptive method for attaining the study's objectives and goals. This strategy entails consolidating and analyzing data through observation, surveys, and interview to answer any inquiries concerning the present condition of the investigation. The descriptive approach was utilized by the researchers to establish the average, characteristics, frequencies, and trends between the variables and perform analysis.

This chapter also covers the research methods and procedures that would be useful in the analysis of the developed system ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance.

The researchers used Agile Methodology as a framework to ensure a successful and consistent project. It was a development approach that establishes the steps and procedures for implementing a system.

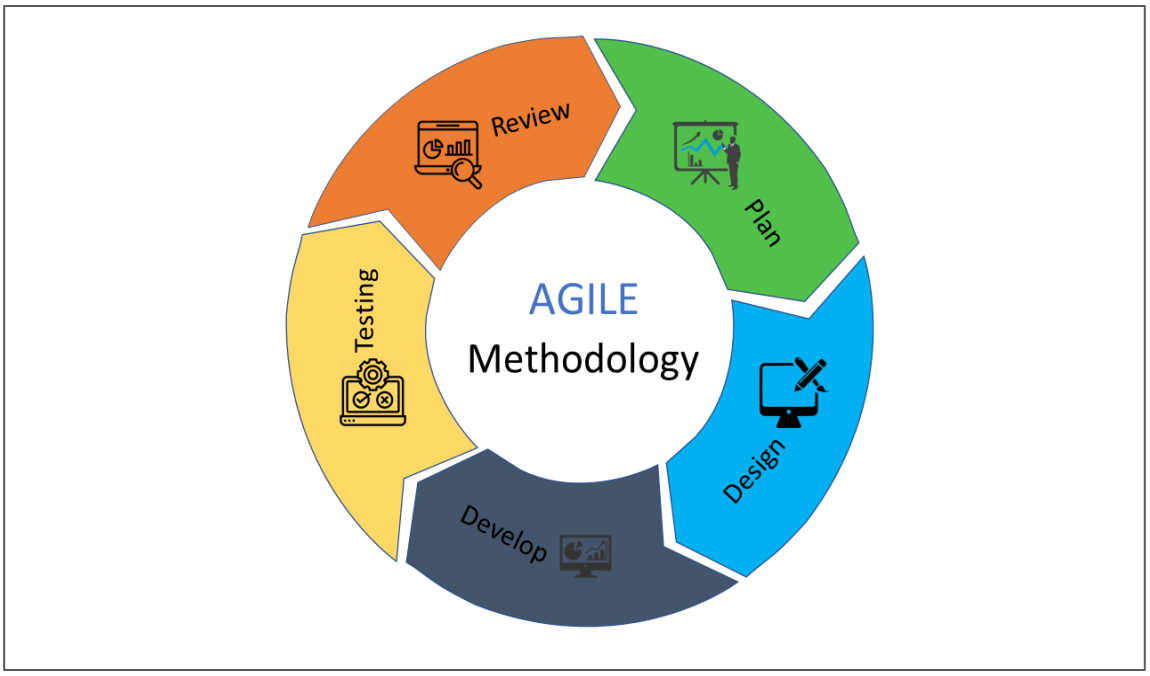


Figure 3.1 Agile Methodology

Figure 3.1 shows the different phases and processes of the Agile development methodology to finish the project. This includes the five phases which are the plan, design, development, testing and review.

Plan Phase

In this stage, the researchers gathered the needed requirements of the end-users and system related information that is required in developing the system. The researchers determine these requirements through interview, observation, and analysis.

Design Phase

In the design stage, the researchers designed the system in accordance with the identified requirements in the planning phase. All gathered information is carefully analyzed in order to come up with the desired functions and overall design of the system. The researchers created the system architecture and used diagrams such as Use Case, Context Diagram, Data Flow Diagram, and Entity Relationship Diagram to design the developed system.

Development Phase

In the develop stage, the researchers applied the design and requirements specification in regard to the planning phase where researchers can start developing all the stated requirements into the system entitled ReAcT. This phase involves a lot of trial and error that must be solved using code composing and coding skills until desired functions are accomplished.

Testing Phase

In the testing stage, it should come up with the sample population to test the system's functionality to check if there are any defects or errors in the system regarding the set requirements. The system was examined to see whether its functions are working perfectly.

Review Phase

The review phase is where end-users would evaluate and assess the system to identify if it is functional or if it must improve the functions of each process until it meets the target quality of the system.

DEVELOPMENT PROCESS

The development process of the developed system includes the application of testing, debugging, and validation. Each of those is essential for the development and improvement of the advancement of the developed system.

Testing Process

Testing is a process that involves running a system or application to find defects as early as possible and ensures that the system complies with the quality standards. Also, it helps to reduce the overall development time and cost to rework by identifying issues early in the development process.

Debugging Process

After the testing process, the researchers discover and fix problems, issues or bugs in system's codes that were missing during testing. It is a crucial part of the software development process that ensures the program functions properly and meets the set requirements. As it assists in identifying issues before they become

significant issues, it can save time and resources during the software development process. Additionally, it guarantees that the software performs as intended and meets the expected quality standards.

Validation Process

The validation process ensures that the software being developed complies with the needs and demands of the end-users. The system must be tested and debugged to ensure that it was accurate and had high quality standards. It helps to reduce the chance of delivering software that does not meet the needs of the stakeholders.

PROGRAMMING PROCEDURE

The following figures illustrated and graphically represented several methods of programming with the used of system architecture, requirements analysis, use case diagram, context diagram, data flow diagram and the entity relationship diagram. This assisted non-IT students to explain and clarify the flow of frameworks with the use of figures and tables below.

System Architecture

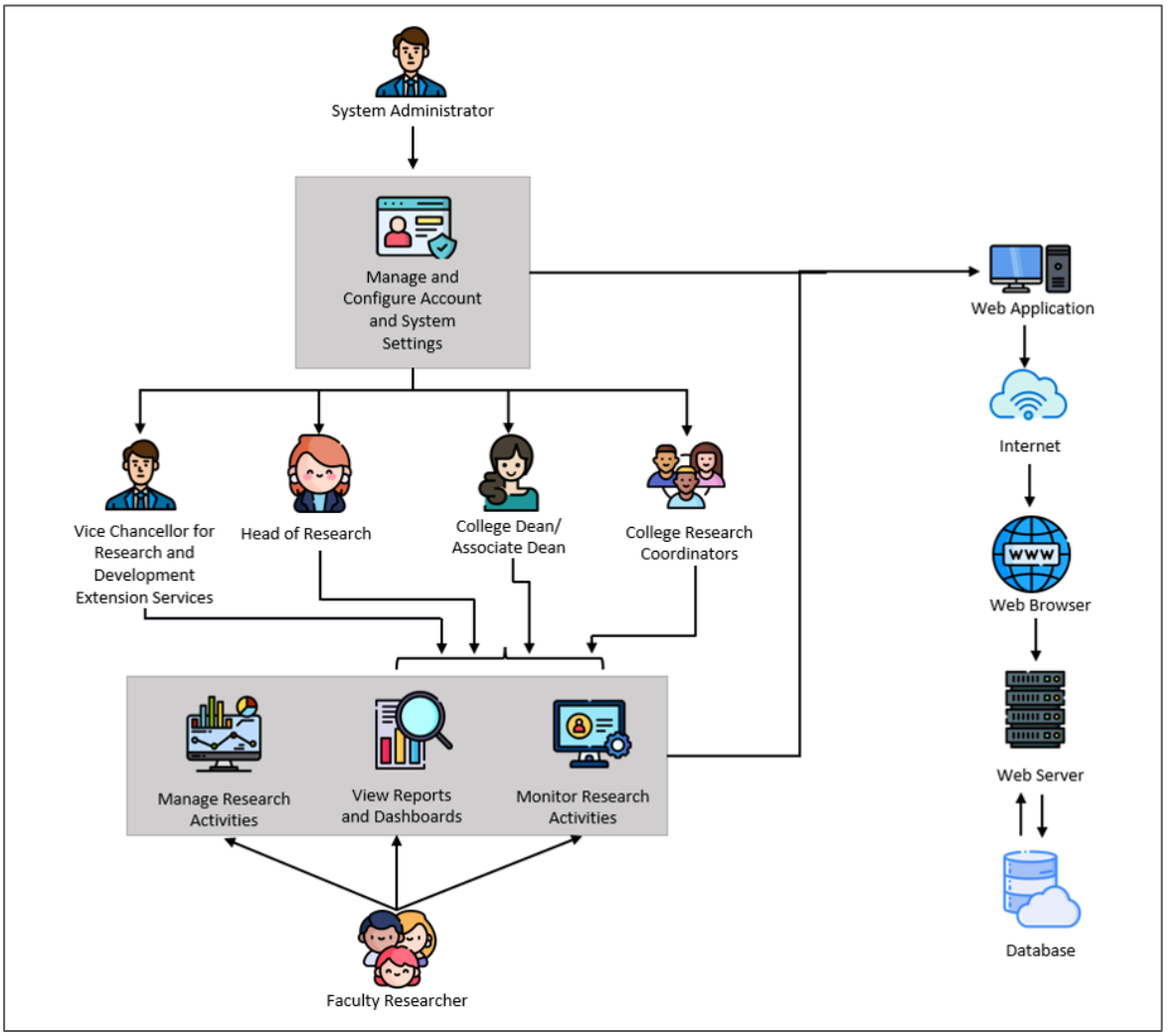


Figure 3.2 System Architecture

Figure 3.2 represents the system architecture adopted by the system, which assists researchers in defining the structure behavior and added view of the developed system. Using their account, the Faculty Researchers can view reports and dashboards. Also, they can manage and monitor their research activities,

specifically, research papers along with the certificates of awards received after attending conferences and they can input information regarding particular research needed. The System Administrator can manage and configure colleges, programs, user accounts, designation, and backup. The Research Unit of the University can track and monitor research activities, particularly viewing different reports and dashboards.

Requirements Analysis

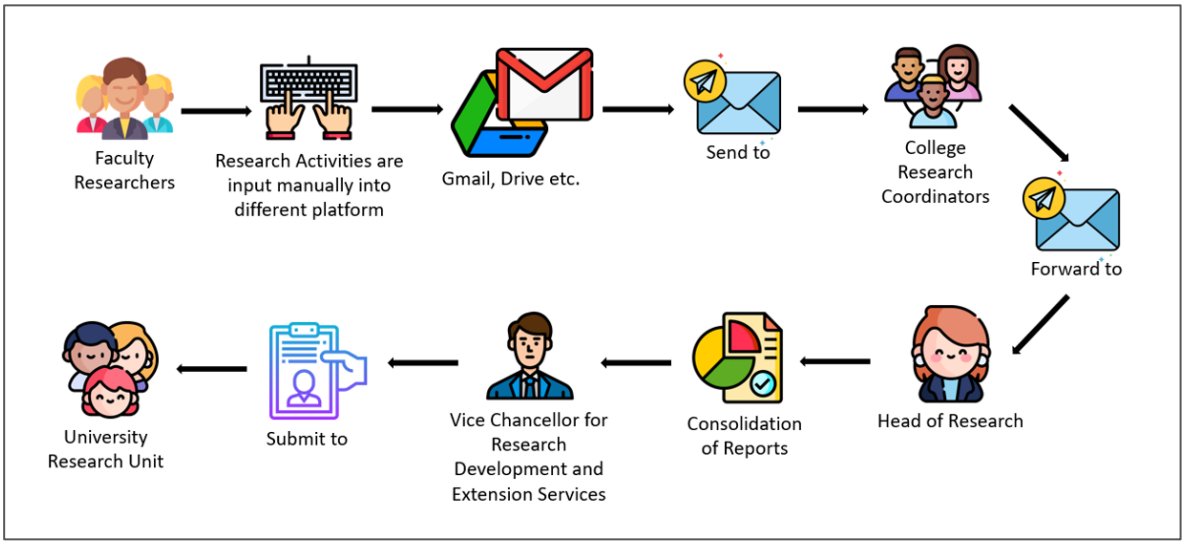


Figure 3.3 Requirements Analysis

Figure 3.3 describes the requirements analysis of the study. It should be a graphical representation of their manual monitoring process. Faculty Researchers use different platforms like Gmail, Drive, etc. Then input research activities and send them to the College Research Coordinators, then it would be forwarded to the

Head of Research. After sending and forwarding such activities, the Head of Research consolidates those reports and submits them to university of Research Unit.

Use Case Diagram

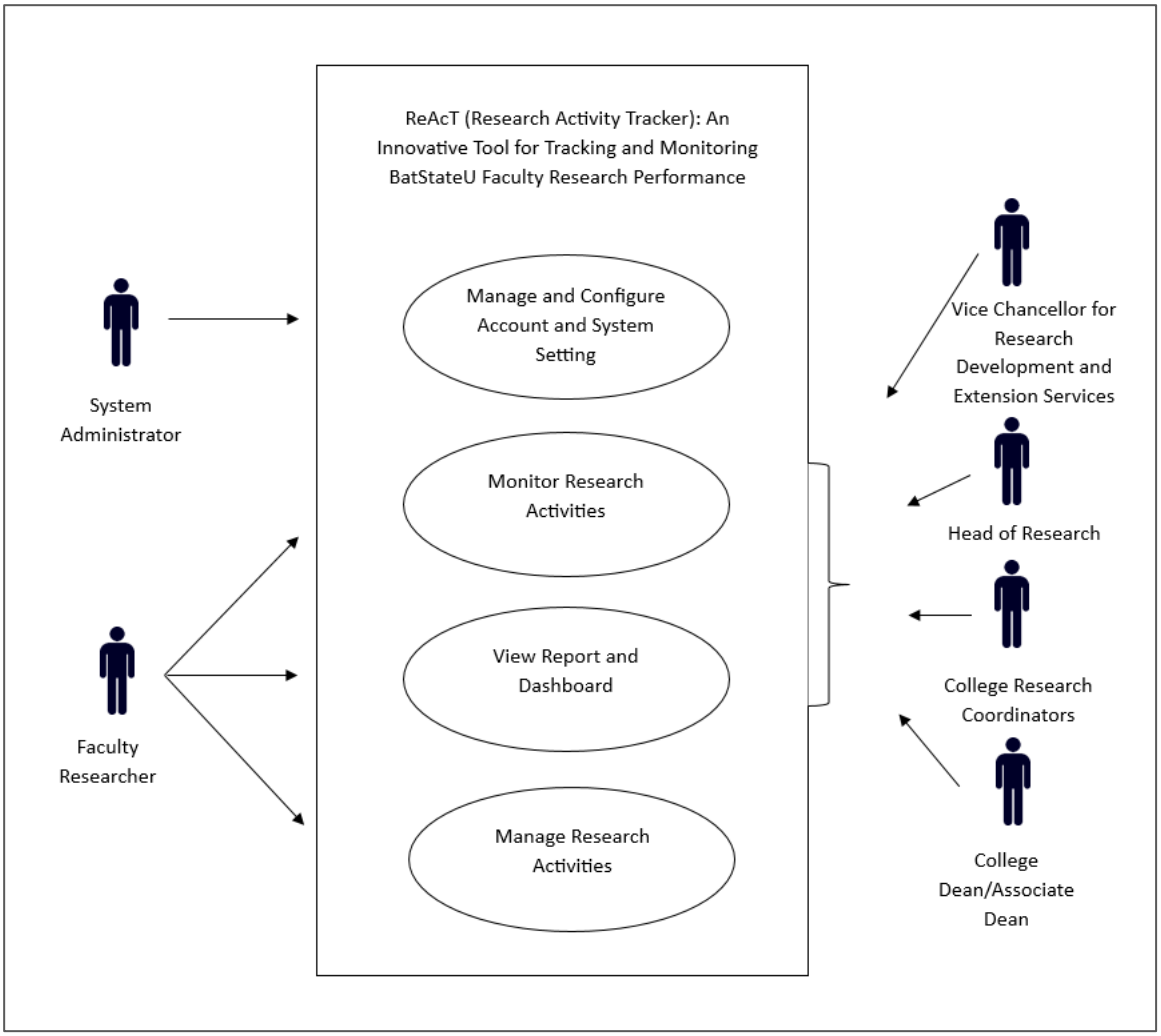


Figure 3.4 Use Case Diagram

The table below explains the actors, roles, and descriptions for each use case.

Table 3.1

MANAGE AND CONFIGURE ACCOUNT SETTINGS USE CASE

Name:	Manage and Configure Account and System Settings
Actor/s:	System Administrator
Role of Actor/s:	Responsible for managing and configuration of campuses, colleges, programs, user accounts, designation, and backup
Description:	Describes the flow of how admin setup university details, manage users and configure account and settings in the system

MONITOR RESEARCH ACTIVITIES USE CASE

Name:	Monitor Research Activities
Actor/s:	Vice Chancellor for Research Development and Extension Services Head of Research College Research Coordinators College Dean/Associate Dean Faculty Researcher
Role of Actor/s:	

	Vice Chancellor for Research Development and Extension Services - Responsible for monitoring research activities filtered by the campus, college, and program *Head of Research* - Responsible for monitoring research activities filtered by the campus, college, and program *College Research Coordinators* - Responsible for monitoring research activities filtered by the college and program *College Dean/Associate Dean* - Responsible for monitoring research activities filtered by the college and program *Faculty Researchers* -Responsible for monitoring their research activities
Description:	Describes the flow of how user monitors the research activities program / college / campus.

VIEW REPORTS AND DASHBOARD USE CASE

Name:	View Reports and Dashboards
Actor/s:	Vice Chancellor for Research Development and Extension Services Head of Research College Research Coordinators College Dean/Associate Dean Faculty Researchers
Role of Actor/s:	*Vice Chancellor for Research Development and Extension Services* - Responsible for viewing the reports and dashboard filtered by the campus, college, and program *Head of Research* - Responsible for viewing the reports and dashboard filtered by the campus, college, and program *College Research Coordinators*

	- Responsible for viewing the reports and dashboard filtered by the college and program *College Dean/Associate Dean* - Responsible for viewing the reports and dashboard filtered by the college and program *Faculty Researchers* -Responsible for monitoring their research activities
Description:	Describes the flow of how user views and monitors the research activities reports and dashboards by program / college / campus.

MANAGE RESEARCH ACTIVITIES USE CASE

Name:	Manage Research Activities
Actor/s:	Faculty Researchers
Role of Actor/s:	Responsible for viewing and managing their research activities
Description:	Describes the flow of how users manage the research activities of their involvement in research.

Context Diagram

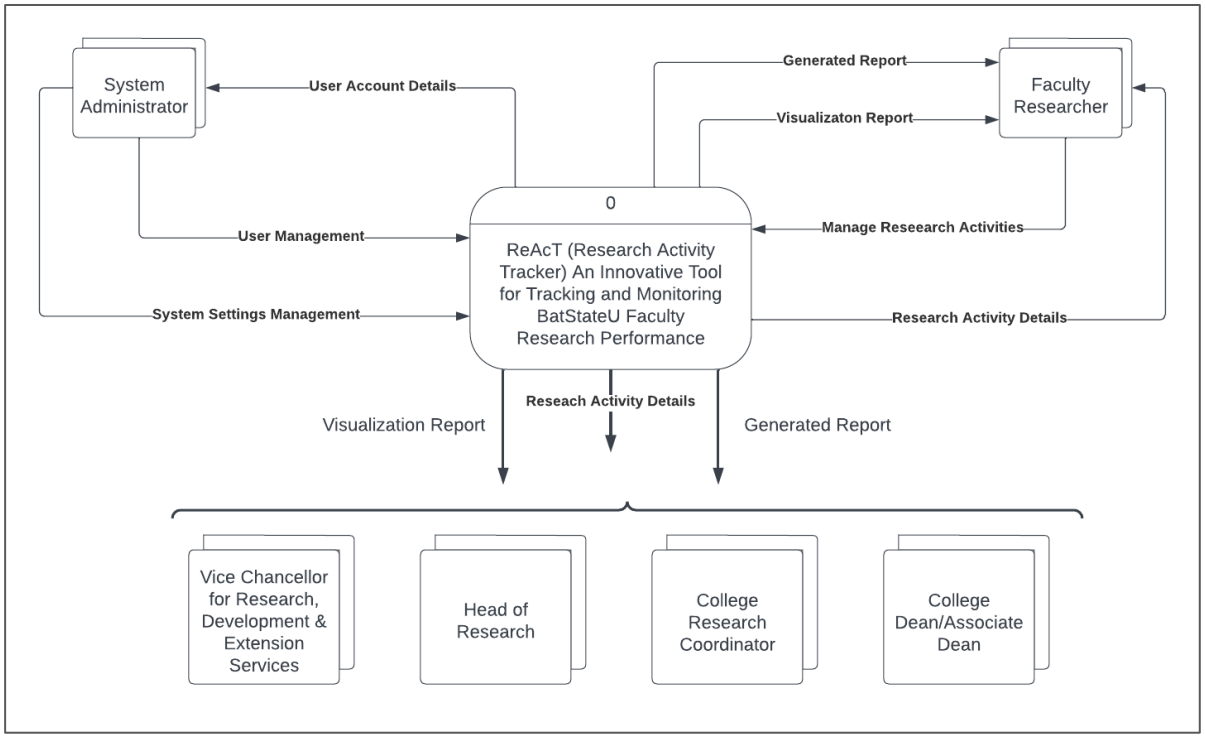


Figure 3.5 Context Diagram

Figure 3.5 illustrates the context diagram represents the ReAcT (Research Activity Tracker) with the entities made up of System Administrator, Vice Chancellor for Research Development & Extension Services, Head of Research, College Dean/Associate Dean, College Research Coordinators, and Faculty Researcher. The ReAcT at the center is reliable for all the information it receives and displays, and the arrows include text labels that represent the direction of the data flow.

Data Flow Diagram

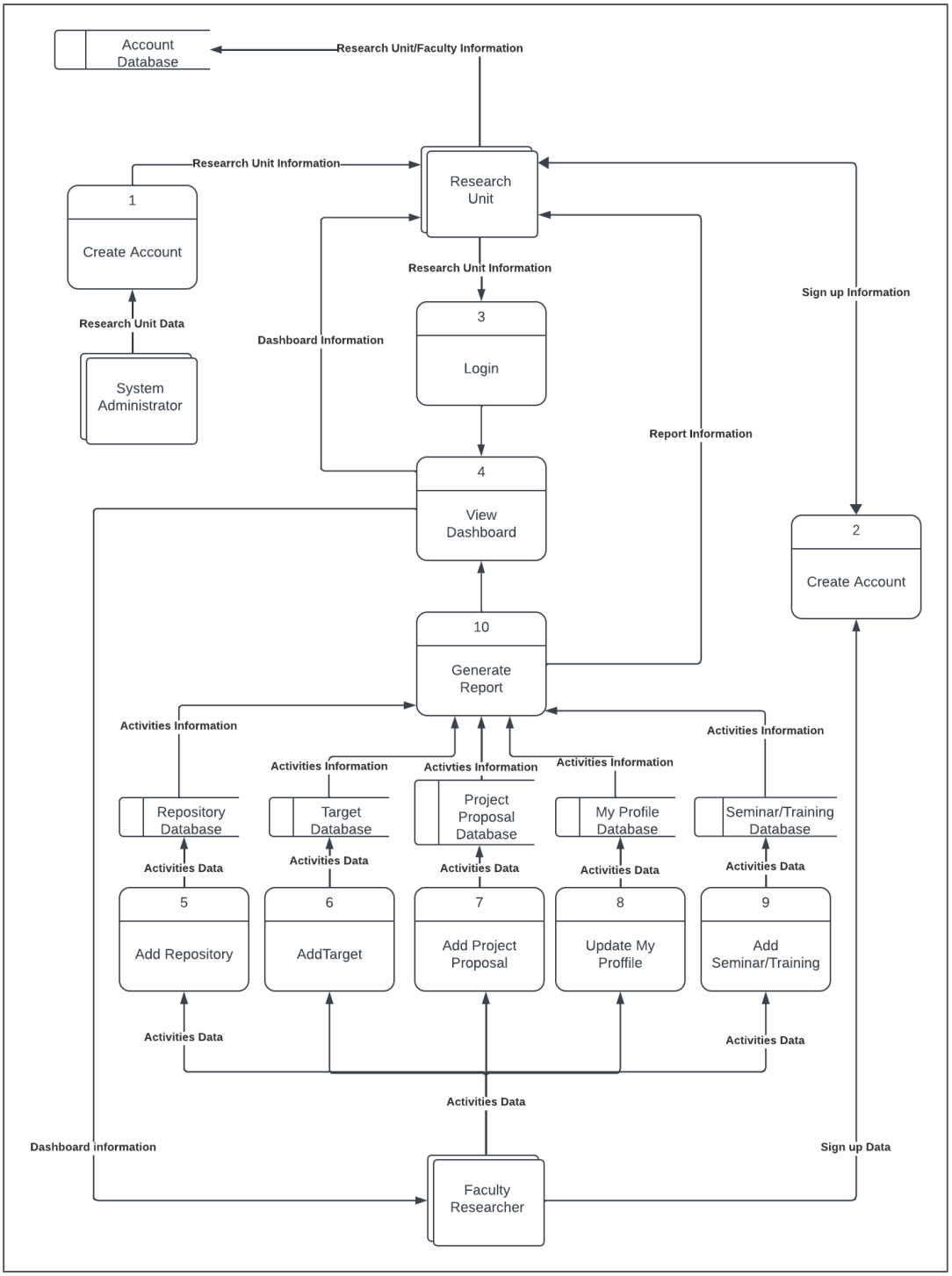


Figure 3.6 Data Flow Diagram

Figure 3.6 shows the data that flows inside the system. It described 3 external entities, 10 process and 6 data stores. In the diagram, Faculty Researchers can do a lot of processes in the system that indicates here that can create accounts, manage, and monitor different research activities. Research Unit can view dashboard and monitor reports. The System Administrator can create Research Unit accounts.

Entity-Relationship Diagram

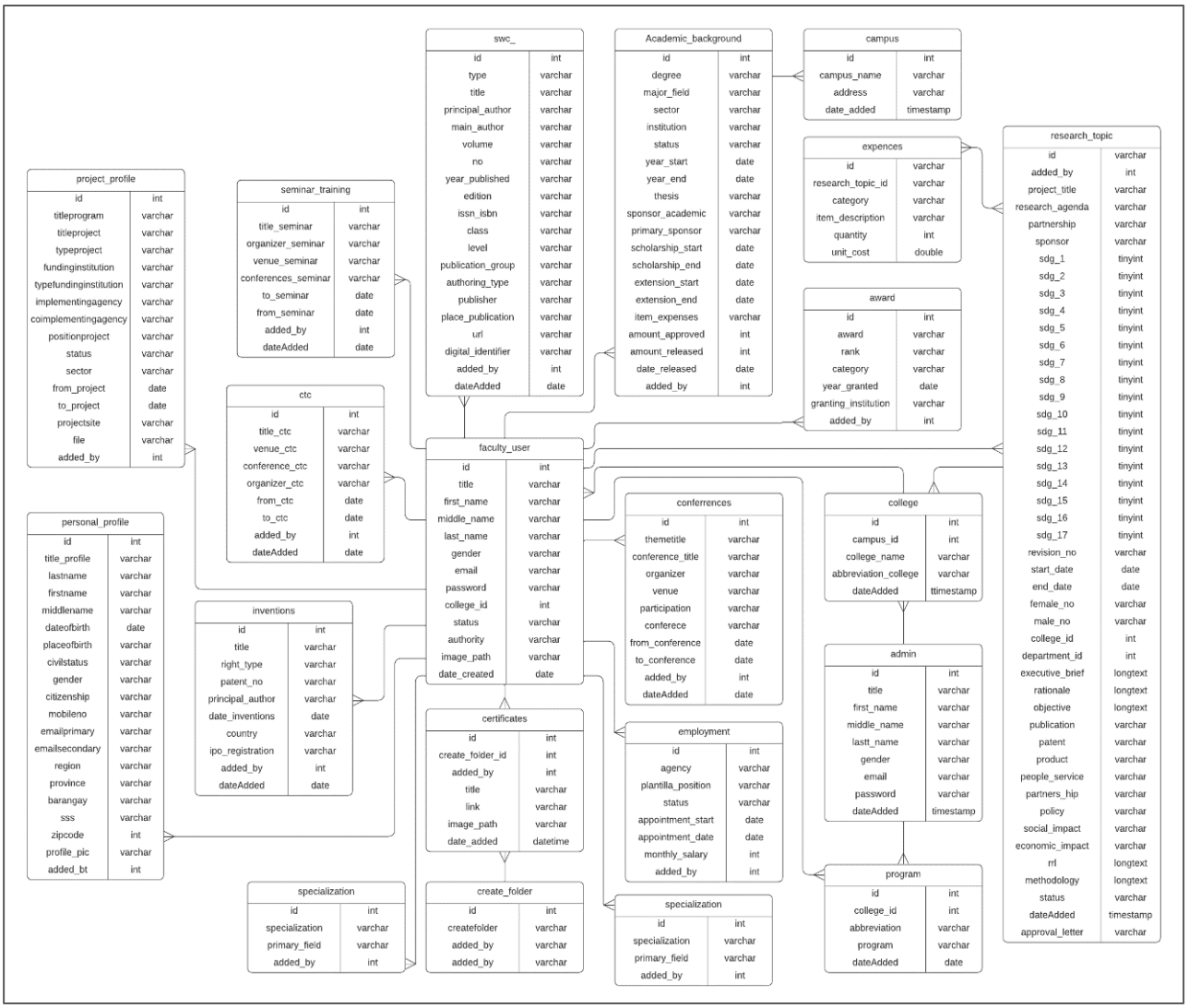


Figure 3.7 Entity Relationship Diagram

Figure 3.7 shows the relationships between each table, attributes, and the overall structure of the database to be implemented in the developed system. This entity relationship diagram is a model that serves as the visual representation of the relationship between entities.

HARDWARE AND SOFTWARE NEEDED IN THE DEVELOPMENT

Hardware Needed

Table 3.2

Hardware Needed in the Development

Particulars	**Specification**
System Unit	A Working unit with at least windows 10 operating system installed.
Processor	At least 2.40GHz or faster processor
Random Access Memory (RAM)	At least 8GB memory card.
Read Only Memory	At least 10GB unused space inside the hard drive.

Internet	At least 80Mbps Internet speed
Server	A cloud-based server should be used to store and process data. The server should have a minimum of 8GB of RAM
Mouse	A functional pointer device for navigation.
Keyboard	English – QWERTY Keyboard.

The following is the list of hardware requirements used during the development process of the system.

The researchers and this hardware for the ReAcT (Research Activity Tracker): An Innovative Tool for Tracking and Monitoring BatStateU Faculty Research Performance. A laptop used by the developer to develop the web-based system.

Software Needed

Table 3.3

Software Needed in the Development

The following is the list of software requirements used during the development process of the system.

Software/Platform	Description
Sublime Text	It is a source code editor used throughout the development process of the system.
MySQL	It is used to manage and build the Relational database.
Cascading Style Sheets (CSS)	A tool used which was responsible for the design of the webpage, how everything looks, and where it is on the page.
Bootstrap	It is used as a web development framework to build the user interface of ReAcT.
PHP	A tool used for fetching data from the database.
JavaScript	It is used for the functionality of the system

The units of software coordinated together for the application that are developed.

INSTRUMENTATION

PREPARATION AND EVALUATION

The researchers would prepare a survey questionnaire that would be distributed to users to determine the level of acceptability and functionality of the system with the use of the guidelines below.

The researchers used the Likert scale score with a range of (A) being the highest value to (E) being the lowest value to measure the respondents' level of satisfaction and acceptability with the system. Each point on the scale had a corresponding value that was used to evaluate the respondents' answers.

$$\text{Likert Scale} = i = \frac{h-l}{t}$$

i = interval

h = highest value in the questionnaires

l = lowest value in the questionnaires

t = total number of preset options in the questionnaires

The researchers also utilized weighted mean to determine values that have more importance or significance than others. Assigned by different weights based on their relevance to get accurate representation of data.

$$\text{Weighted mean} = \bar{x} = \frac{\sum_{i=1}^{n}(w_i * x_i)}{\Sigma_{i=1}^{n} w_i}$$

$\bar{x}$ = weighted average

Σ = summation

w = weights applied to x values

x = data values to be averaged

n = number of terms to be averaged

Table 3.4

Guidelines for determining the level of satisfaction of the respondents on the developed system.

Scale	**Mean Range**	**Descriptive Equivalent**
5	4.21 – 5.00	Almost always
4	3.41 – 4.20	Most of the time
3	2.61 – 3.40	About half of the time
2	1.81 – 2.60	Some of the time
1	1.0 – 1.80	Almost never

Table 3.5

Guidelines for determining the level of acceptance of the developed system.

Scale	Mean Range	Descriptive Equivalent
5	4.21 – 5.00	Highly Acceptable
4	3.41 – 4.20	Moderately Acceptable
3	2.61 – 3.40	Acceptable
2	1.81 – 2.60	Slightly Acceptable
1	1.0 – 1.80	Not Acceptable

Table 3.6

Guidelines for determining the level of satisfaction of the developed system.

Scale	Mean Range	Descriptive Equivalent
5	4.21 – 5.00	Highly Satisfied
4	3.41 – 4.20	Moderately Satisfied
3	2.61 – 3.40	Satisfied
2	1.81 – 2.60	Slightly Satisfied
1	1.0 – 1.80	Not Satisfied

Sample Size Determination

The respondents of the study would include one (1) VCRDES, one (1) Head of Research, four (4) College Research Coordinators, four (4) College Dean/ Associate Dean, twenty (20) Faculty Researcher and five (5) IT Experts participated in the study. They would be asked to utilize and evaluate the developed system.

Sampling Procedure

The researcher performed purposive sampling for the faculty researchers, Research Unit of the University as well as for the IT Experts that ended up with an overall total of 35 respondents. The respondents are the Research Unit of the University including the VCRDES, Head of Research, College Research Coordinators, College Dean/Associate Dean, and some Faculty Researchers of Batangas State University the National Engineering University ARASOF-Nasugbu Campus and IT Experts. Their response would be valuable to the researchers and to the developed system as it helps to gather respondents' insight. Questionnaire would be disseminated to the respondents face to face.

Participants of the study

Table 3.7 Guideline Interval for Questionnaire

Respondents	**Number**	**Sampling Type**
Vice Chancellor for Research Development and Extension Services	1	Purposive
Head of Research	1	Purposive
College Research Coordinators	4	Purposive
College Dean /Associate Dean	4	Purposive
Faculty Researcher	20	Purposive
IT Experts	5	Purposive
Total:	**35**	

CHAPTER IV
RESULTS AND DISCUSSION

This chapter presents the data of findings and the analysis based on the answers of the respondents to the questionnaire that is conducted for the developed system. The data were presented systematically by tables and were given the corresponding interpretations.

HARDWARE SPECIFICATION

Table 4.1

Hardware Specification of the Developed System

Hardware Components	Recommended Specification
Processor	2.40GHz
Random Access Memory (RAM)	At least 8GB.
Read Only Memory	At least 10GB unused space inside the hard drive.

The tables above showed the required hardware specifications for desktop. Each hardware components mentioned are highly recommended in order to run the system.

SOFTWARE SPECIFICATION

Table 4.2

Software Specification of the Developed System

Software Component	Specification
Web Browser	Any version of Google Chrome
Internet Connection	At least 80Mbps
Software Component	Specification
Screen Resolution	1920 x 1080 pixels

The table 4.2 shows the software specification needed to use the system. Each software components mentioned on the table are highly needed in order to make the system running and functioning.

TEST PLAN

This part contains the test cases of the developed system. It shows all the modules of the test procedure, targets, exertion, plan and assets required to the system. The intent of finding the software bugs. It can also be a stated process of validating and verify the system.

Table 4.3

Test Case Summary

Test ID	Test Scenario	Expected Result	Actual Result	Status
01	Verify if system administrator module are accessible.	System administrator can create account and designate a user.	As Expected	Pass
02	Verify if created account are working/can log in.	Credentials can be entered and can successfully logged in.	As Expected	Pass
03	Verify if the dashboard are accessible	Graphs are working and its filtering functionality	As Expected	Pass
04	Verify if profile module are accessible	Successfully inputted personal profile	As Expected	Pass
05	Verify if proposal module are accessible	Research project can be added and	As Expected	Pass

		should be listed on the table		
06	Verify if target module are accessible	Target research activities can be entered and will appear on the linegraph	As Expected	Pass
07	Verify if repository module are accessible	Can create necessary folder and can upload PDF files	As Expected	Pass
08	Verify if monitoring module are accessible	Can filter by colleges and view different reports	As Expected	Pass
09	Verify if report generation module are accessible	Uploaded and filed proposal are convertible and downloadable to PDF files.	As Expected	Pass

Table 4.3 presents the test case summary of the system. The test verifies if all the modules that the system have are working properly and functioning as expected.

IMPLEMENTATION PLAN

The researchers first developed their database using XAMPP v.3.3.0. Then, to implement the system, the researchers wrote the source codes for web interfaces using Sublime Text.

Table 4.4

Implementation Plan

Tasks	Activity	Persons Involved	Duration
Testing and Evaluation	After development process, the system should be tested and evaluated before it deploys to see if its running and functioning.	Researchers	5 days
Deployment	To deploy the system, the researchers choose the Digital Ocean as database.	Researchers	3 Days
Maintenance	After deployment, the system needs to	Researchers	7 days

	monitor to see if it's functioning as expected and check if there's an error that unexpectedly occurred which didn't exist in the development phase then fixing it to keep the system running.		

EVALUATION

The researchers evaluated the ReAcT (Research Activity Tracker) System to 35 respondents one (1) VCRDES, one (1) Head of Research, four (4) College Research Coordinators, four (4) College Dean/ Associate Dean, twenty (20) Faculty Researcher and five (5) IT Experts, were provided by the researchers with the purpose of conducting an evaluation about the issues and challenges they encountered, to assess the level of acceptance, and to measure the level of satisfaction of the respondents.

FINDINGS AND INTERPRETATIONS

This part shows the result of issues and challenges encountered by the Head of Research and Vice Chancellor for Research Development and Extension Service (VCRDES) in terms of Monitoring, Consolidating, and Storing of data regarding

research activities, the level of satisfaction, and level of acceptance in the developed ReAcT System wherein 35 (thirty-five) respondents have been tested. Each of the categories' average was computed. Each computed average was created tables below to precisely showcase each category's mean.

Table 4.5

Level of Satisfaction of the Faculty Researchers.

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	4.63	Almost always
Content	4.74	Almost always
Ease of Use	4.75	Almost always
Format	4.70	Almost always
Timeliness	4.65	Almost always
Overall satisfaction	4.65	Almost always

Table 4.5 shows the survey result of the level of satisfaction of Faculty Researcher in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, ease of use has the highest weighted mean of 4.75 which interpreted that the Faculty Researcher were Almost always satisfied

with the system ease of use while the accuracy get the lowest weighted mean of 4.63 which interpreted that the Faculty Researcher are almost always satisfied with the system accuracy. The general weighted mean of the level of satisfaction by the Faculty Researcher is 4.69 which interpreted as Almost always. Furthermore, these results revealed that most of the respondents were Almost always satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of satisfaction in terms of system accuracy, ease of use, format, timeliness and overall satisfaction. Some of the literatures are focused on the evaluation of content like the Designing a Centralized Faculty Performance Dashboard: Optimizing Feedback and Scholarly Data Reporting. It means that the ReAcT provides a unique evaluation result for the level of satisfaction.

Table 4.6

Level of Satisfaction of the Research Coordinator.

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	4.88	Almost always
Content	4.75	Almost always
Ease of Use	4.75	Almost always

Format	4.88	Almost always
Timeliness	4.63	Almost always
Overall satisfaction	4.88	Almost always

Table 4.6 shows the survey result of the level of satisfaction of Research Coordinator in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, accuracy, format and overall satisfaction has the highest weighted mean of 4.88 which interpreted that the Faculty Researcher were Almost always satisfied with the system accuracy, format and overall satisfaction while the timeliness get the lowest weighted mean of 4.63 which interpreted that the Research Coordinator are Almost always satisfied with the system accuracy, format and overall satisfaction. The general weighted mean of the level of satisfaction by the Research Coordinators is 4.79 which interpreted as Almost always. Furthermore, these results revealed that most of the respondents were Almost always satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of satisfaction in terms of system content, ease of use, format, timeliness and overall satisfaction. Some of the literatures are focused on the evaluation of completeness, accuracy and reliability like the Monitoring of

Faculties and Departments Research Activity as a Components of University Management. Stanislav Podolyanchuk Vinnytsia Mykhailo Kotsiubynsky State Pedagogical University, Ukraine. It means that the ReAcT provides a unique evaluation result for the level of satisfaction.

Table 4.7

Level of Satisfaction of the College Dean/Associate Dean.

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	4.13	Most of the time
Content	4.19	Most of the time
Ease of Use	4.25	Almost always
Format	4.00	Most of the time
Timeliness	3.75	Most of the time
Overall satisfaction	4.00	Most of the time

Table 4.7 shows the survey result of the level of satisfaction of College Dean/Associate Dean in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, ease of use has the highest weighted mean of 4.25 which interpreted that the College Dean/Associate Dean

were Almost always satisfied with the system ease of use while the timeliness get the lowest weighted mean of 3.75 which interpreted that the College Dean/Associate Dean are Most of the time satisfied with the system timeliness. The general weighted mean of the level of satisfaction by the College Dean/Associate Dean is 4.05 which interpreted as Most of the time. Furthermore, these results revealed that most of the respondents were Most of the time satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of satisfaction in terms of system accuracy, content, format, timeliness and overall satisfaction. terms of system accuracy, ease of use, format, timeliness and overall satisfaction. Some of the literatures are focused on the evaluation of content like the Designing a Centralized Faculty Performance Dashboard: Optimizing Feedback and Scholarly Data Reporting. It means that the ReAcT provides a unique evaluation result for the level of satisfaction.

Table 4.8

Level of Satisfaction of the Head of Research.

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	4.15	Most of the time
Content	4.16	Most of the time
Ease of Use	4.85	Almost always
Format	4.77	Almost always
Timeliness	4.21	Almost always
Overall satisfaction	4.27	Almost always

Table 4.8 shows the survey result of the level of satisfaction of Head of Research in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, ease of use has the highest weighted mean of 4.85 which interpreted that the Faculty Researcher were Almost always satisfied with the system ease of use while the accuracy get the lowest weighted mean of 4.15 which interpreted that the Head of Research are Most of the time satisfied with the system accuracy. The general weighted mean of the level of satisfaction by the Head of Research is 4.40 which interpreted as Almost always. Furthermore, these results

revealed that most of the respondents were Almost always satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of satisfaction in terms of system accuracy, ease of use, and overall satisfaction. Some of the literatures are focused on the evaluation of timeliness, quality content and completeness like A Web-Based Monitoring and Evaluation System for Government Projects in Tanzania: The Case of Ministry of Health. It means that the ReAcT provides a unique evaluation result for the level of satisfaction.

Table 4.9

Level of Satisfaction of the VCRDES (Vice Chancellor for Research Development and Extension Services).

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	4.09	Most of the time
Content	4.07	Most of the time
Ease of Use	4.92	Almost always
Format	4.72	Almost always
Timeliness	4.39	Almost always

Overall satisfaction	4.14	Most of the time

Table 4.9 shows the survey result of the level of satisfaction of VCRDES in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, ease of use has the highest weighted mean of 4.92 which interpreted that the VCRDES were Almost always satisfied with the system ease of use while the content get the lowest weighted mean of 4.07 which interpreted that the VCRDES are most of the time satisfied with the system content. The general weighted mean of the level of satisfaction by the VCRDES is 4.39 which interpreted as Almost always. Furthermore, these results revealed that most of the respondents were Almost always satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of satisfaction in terms of system accuracy, content, ease of use, timeliness and overall satisfaction. Some of the literatures are focused on the evaluation of research productivity and quality content like the Research Teaching and Performance Evaluation in Academia: The Salience of Quality. It means that the ReAcT provides a unique evaluation result for the level of satisfaction.

Table 4.10

Level of Satisfaction of the IT Experts.

Parameters	General Weighted Mean	Verbal Interpretation
Accuracy	5.00	Almost always
Content	5.00	Almost always
Ease of Use	5.00	Almost always
Format	5.00	Almost always
Timeliness	5.00	Almost always
Overall satisfaction	5.00	Almost always

Table 4.10 shows the survey result of the level of satisfaction of IT Experts in terms of accuracy, content, ease of use, format, timeliness and overall satisfaction. Based on the evaluation, each of the parameters has the highest weighted mean of 5.00 which interpreted that the IT Experts were Almost always satisfied with the system e accuracy, content, ease of use, format, timeliness and overall satisfaction. The general weighted mean of the level of satisfaction by the IT Experts is 5.00 which interpreted as Almost always. Furthermore, these results revealed that all of

the respondents were Almost always satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction.

Table 4.11

Level of Acceptance of the Faculty Researchers.

Parameters	General Weighted Mean	Verbal Interpretation
Efficiency	4.70	Highly Acceptable
Functionality	4.60	Highly Acceptable
Reliability	4.65	Highly Acceptable
Usability	4.65	Highly Acceptable
Security	4.75	Highly Acceptable

Table 4.11 shows the survey result of the level of acceptance of Faculty Researcher in terms of efficiency, functionality, reliability, usability, and security. Based on the evaluation, security has the highest weighted mean of 4.75 which interpreted that the Faculty Researcher were Highly acceptable the system security while the functionality get the lowest weighted mean of 4.60 which interpreted that the Faculty Researcher are Highly acceptable the system functionality. The general weighted mean of the level of acceptance by the Faculty Researcher is 4.67 which interpreted as Highly Acceptable. Furthermore, these results revealed that most of

the respondents were highly accepted the system efficiency, functionality, reliability, usability, and security.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of acceptance in terms of system functionality, reliability, usability and security. Some of the literatures are focused on the evaluation of efficiency like the Online Day to Day Monitoring System for Lyceum of the Philippines University-Batangas. It means that the ReAcT provides a unique evaluation result for the level of acceptance.

Table 4.12

Level of Acceptance of the Research Coordinators.

Parameters	General Weighted Mean	Verbal Interpretation
Efficiency	4.60	Highly Acceptable
Functionality	4.70	Highly Acceptable
Reliability	4.75	Highly Acceptable
Usability	4.95	Highly Acceptable
Security	4.85	Highly Acceptable

Table 4.12 shows the survey result of the level of acceptance of Research Coordinator in terms of efficiency, functionality, reliability, usability, and security.

Based on the evaluation, usability has the highest weighted mean of 4.95 which interpreted that the Research Coordinator were Highly acceptable the system usability while the efficiency get the lowest weighted mean of 4.60 which interpreted that the Research Coordinator are Highly acceptable the system efficiency. The general weighted mean of the level of acceptance by the Faculty Researcher is 4.77 which interpreted as Highly Acceptable. Furthermore, these results revealed that most of the respondents were highly accepted the system efficiency, functionality, reliability, usability, and security.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of acceptance in terms of system efficiency, reliability, and security. Some of the literatures are focused on the evaluation of functionality, usability, compatibility like the University Research Production and Utilization Management System. It means that the ReAcT provides a unique evaluation result for the level of acceptance.

Table 4.13

Level of Acceptance of the College Dean/Associate Dean.

Parameters	General Weighted Mean	Verbal Interpretation
Efficiency	4.00	Moderately Acceptable
Functionality	3.80	Moderately Acceptable
Reliability	4.10	Moderately Acceptable
Usability	3.80	Moderately Acceptable
Security	4.45	Highly Acceptable

Table 4.13 shows the survey result of the level of acceptance of College Dean/Associate Dean in terms of efficiency, functionality, reliability, usability, and security. Based on the evaluation, security has the highest weighted mean of 4.45 which interpreted that the College Dean/Associate Dean were Highly acceptable the system security while the functionality and usability get the lowest weighted mean of 3.80 which interpreted that the College Dean/Associate Dean are moderately acceptable the system functionality and usability. The general weighted mean of the level of acceptance by the College Dean/Associate Dean is 4.03 which interpreted as Moderately Acceptable. Furthermore, these results revealed that most of the

respondents were moderately accepted the system efficiency, functionality, reliability, usability, and security.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of acceptance in terms of system functionality, reliability, usability, and security. Some of the literatures are focused on the evaluation of efficiency like the Comparative Historical Trends of Faculty Performance in Instruction, Research and Extension in a Philippine State University. It means that the ReAcT provides a unique evaluation result for the level of acceptance.

Table 4.14
Level of Acceptance of the Head of Research.

Parameters	General Weighted Mean	Verbal Interpretation
Efficiency	3.80	Moderately Acceptable
Functionality	4.40	Highly Acceptable
Reliability	4.20	Moderately Acceptable
Usability	5.00	Highly Acceptable
Security	5.00	Highly Acceptable

Table 4.14 shows the survey result of the level of acceptance of Head of Research in terms of efficiency, functionality, reliability, usability, and security. Based on the

evaluation, usability and security has the highest weighted mean of 5.00 which interpreted that the head of research were Highly acceptable the system usability and security while the efficiency get the lowest weighted mean of 3.80 which interpreted that the Head of Research are moderately acceptable the system efficiency. The general weighted mean of the level of acceptance by the Head of Research is 4.48 which interpreted as Highly Acceptable. Furthermore, these results revealed that most of the respondents were highly accepted the system efficiency, functionality, reliability, usability, and security.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of acceptance in terms of system efficiency, functionality, reliability, usability, and security. Some of the literatures are focused on the evaluation of productivity like the Monitoring an Institution's Research Activities. It means that the ReAcT provides a unique evaluation result for the level of acceptance.

Table 4.15

Level of Acceptance of the VCRDES (Vice Chancellor for Research Development and Extension Services).

Parameters	General Weighted Mean	Verbal Interpretation
Efficiency	4.60	Highly Acceptable
Functionality	4.60	Highly Acceptable
Reliability	4.40	Highly Acceptable
Usability	5.00	Highly Acceptable
Security	5.00	Highly Acceptable

Table 15. shows the survey result of the level of acceptance of VCRDES in terms of efficiency, functionality, reliability, usability, and security. Based on the evaluation, usability and security has the highest weighted mean of 5.00 which interpreted that the VCRDES were Highly acceptable the system usability and security while the reliability get the lowest weighted mean of 4.40 which interpreted that the VCRDES are highly acceptable the system reliability. The general weighted mean of the level of acceptance by the VCRDES is 4.72 which interpreted as Highly Acceptable. Furthermore, these results revealed that most of the respondents were highly accepted the system efficiency, functionality, reliability, usability, and security.

Based on the related literatures gathered by the researchers, there was no evaluation for the level of acceptance in terms of system efficiency and security. Some of the literatures are focused on the evaluation of functionality, usability, and reliability like the Designing and Implementing e-School Systems: An Information Systems Approach to School Management of a Community College in Northern Mindanao, Philippines. It means that the ReAcT provides a unique evaluation result for the level of acceptance.

Table 4.16

Level of Satisfaction of the VCRDES, Head of Research, College Research Coordinators, and College Dean/Associate Dean.

Parameters	General Weighted Mean	Verbal Interpretation
Dashboard	4.67	Highly Satisfied
Research Performance Monitoring	4.60	Highly Satisfied
Report Generation	4.63	Highly Satisfied

Table 4.16 shows the survey result of the level of satisfaction of VCRDES, Head of Research, College Research Coordinators, and College Dean/Associate Dean in terms of dashboard, research performance monitoring and report generation. Based

on the evaluation, dashboard has the highest weighted mean of 4.67 which interpreted all of the respondents were Highly satisfied with the system dashboard while the research performance monitoring get the lowest weighted mean of 4.60 which interpreted that all of the respondents are highly satisfied the research performance monitoring. The general weighted mean of the level of satisfaction by all the respondents is 4.63 which interpreted as Highly satisfied. Furthermore, these results revealed that most of the respondents were highly satisfied in terms of dashboard, research performance monitoring and report generation.

CHAPTER V

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions and recommendations for the developed system.

SUMMARY OF FINDINGS

The researchers conducted an interview with the Head of Research and VCRDES to gather and analyze the challenges encountered in monitoring, consolidating, and storing of data regarding research activities. After analysis and thorough research, the researchers started to develop the system that would help the users. The researchers also conducted a survey to evaluate the issues and challenges encountered, to assess the level of acceptance and to measure the level of satisfaction of the respondents. The results in various indices are shown in the previous tables.

1. The level of satisfaction of the respondents on the developed ReAcT System in terms of accuracy gets a weighted mean of 4.48 which interpreted as Almost always, as well as the content with 4.49, ease of use with a weighted mean of 4.75, format with a weighted mean of 4.68, timeliness with the weighted of 4.44

and the overall satisfaction with a weighted mean of 4.49 which also interpreted as Almost always.

2. The level of acceptance of the respondents on the developed ReAcT System in terms of efficiency gets a weighted mean of 4.34, functionality with a weighted mean of 4.42, as well as reliability with a weighted mean of 4.42, usability with 4.68 which interpreted as Highly acceptable as well as the security with a weighted mean of 4.81 which also interpreted as Highly acceptable.
3. The level of satisfaction of the respondents on the developed ReAcT System in terms of dashboard gets a weighted mean of 4.67, research performance monitoring with 4.60 which interpreted as Highly acceptable. While the report generation with a weighted mean of 4.63 which also interpreted as Almost always.

CONCLUSIONS

Based on the findings and data interpretation, the following conclusions were drawn:

1. The evaluation result of the level of satisfaction by the respondents on the developed ReAcT System are interpreted as Almost always due to the fact that the information provided by the system is accurate, detailed, easy to use, has correct formatting, fast in executing needed reports and is satisfied to overall

functionality of the system. Based on the result, the respondents are really satisfied with the system accuracy, content, ease of use, format, timeliness and overall satisfaction. It proves that there's a high possibility that the system will be implemented to help the users who needs it.

2. The level of acceptance by the respondents on the developed ReAcT System are interpreted as Highly acceptable because the respondents evaluated that the system is functional and running based on its expected performance, reliable, usable and does not compromise any user's personal data. Based on the result, the system outcomes have been positive and there is a good chance that it will be extremely beneficial to all users.
3. The evaluation result of the level of satisfaction by the respondents on the developed ReAcT System are interpreted as Almost always due to the fact that the end users are satisfied by features provided by the system. Based on the result, the respondents are really satisfied with the system dashboard, research performance monitoring and report generation. It proves that there's a high possibility that the system will be implemented to help the users who needs it.

RECOMMENDATIONS

The developed web system provides a research activity tracker to the user to manage and monitor different research activities. This feature would benefit the user

to improve the monitoring, consolidating and storing of data. Thus, it is recommended that:

1. For future researchers, additional engagement features are recommended to encourage the users to use the system.
2. It is recommended to make the application available on different browsers.
3. It is recommended to add messaging features for faster communication in terms of immediate requirements needed.
4. For future researchers, additional feature is recommended specifically, history revision of research for back track.
5. It is recommended to add comment section on the repository module to provide communication channel if necessary, revision are needed.

IT Experts' Suggestions

6. To improve the performance of the developed system, it is recommended that:
    - Notification through email is highly recommended for the end user/s to be aware regarding to the due date of research proposal of the faculty researchers.

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