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Enhancing Supply and Inventory Operations through a Material Resource Information System (MRIS) at Holy Trinity College of General Santos City

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ABSTRACT

Educational Institutions depend on the Supply Management Offices (SMOs) to manage their procurement and use of supplies, facilities, and equipment. Within Holy Trinity College, manual processes for dealing with requests, procurement and stock management were in place, resulting in inefficiencies, inaccuracies and delays in reporting. To address these challenges, this study designed and developed a Material Resource Information System (MRIS) using the CakePHP framework to automate supply management operations. The system was designed using a 'Hybrid SDLC approach', which incorporates structured development methodology of the Waterfall approach with the adaptability of iterative development of the Agile approach thus providing a methodology that was both rigorous and adaptable to feedback from the users. Some great features were the automated request processing, the real-time tracking of inventory, and reporting. To assess the effectiveness of the system, user satisfaction, usability, functionality, and usefulness were considered, a survey was conducted among 10 respondents including the Property Custodian, the office staff, and randomly selected personnel from the HTC. The results revealed means of Very Good for usefulness (4.71), user satisfaction (4.55), functionality (4.68), and usability (4.43) respectively. Results show that MRIS has a specific ability to reduce inefficiency within supply management operations and boost decision-making quality and accuracy. Overall, the study has shown that the developed system is a practical and reliable solution for automating inventory and procurement processes in academic institutions, providing benefits in terms of increased transparency, accountability, and effectiveness.

INTRODUCTION

The Supply Management Office (SMO) is one of the important offices in every academic institution having a special role to directly ensure supplies, facilities and equipment are being acquired, distributed and utilized accordingly. The implementation of this responsibility at Holy Trinity College of General Santos City has been done manually. The appropriate Dean, Department Head, Faculty, and Staff members have to sign the request forms, get the approving/recommending officer's signature, and send them to SMO for purchase/release. This way the right permissions are given, but it can be lengthy, ineffective and hard to manage the transactions.

Manual processes are also tedious in inventory management, another important part of the SMO. The logbooks are recorded using MS Excel which can be subject to human error, making it difficult to track received/replaced/damaged logs or logs that have been replaced. Challenges- Generating a report is a tedious process for the Property Custodian, as all the entries in the logbook must be consolidated before any report can be generated. Such problems are detrimental to good resource management, productivity and accountability in handling supplies.

Considering these challenges, the study set out to look at three(3) major concerns: Inefficiency in the request and approval process, inability to track inventory, and inability to generate any kind of reports on time, and with reliability. Because the system has been manual, it has caused delays in the process and has created a need for an automated solution that will provide a clear, accurate and efficient way to handle the transactions, inventory, and create consistent, accurate reports about the SMO.

The main goal of this study is to design and develop an automated Material Resource Information System (MRIS) to help in the material supply request, procurement and stock management process at Holy Trinity College. More specifically the system will aim to work towards the automation of the period of request and approval, reduce time delays and ensure proper documentation, use of a stock list which will give visibility of all the stock flows and from there supply a precise and timely stock list report, to better assist in decision making and provide the transparency of the use of resources. The MRIS is built using CakePHP, a user-friendly, systematic, reliable and efficient solution, that enhances the management of resources and contributes to greater efficiency, accuracy and accountability.

The system was developed with a Software Development Life Cycle (SDLC) approach in a hybrid mode structure, and flexibility was ensured. On macro level, Waterfall model provided a staged sequence of Analysis, Design, Implementation and Deployment with the promise of proper documentation and compliance, as well as

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traceability. This would ensure institutional standard and discipline and accountability in the developmental process. The Agile model was however adopted for the implementation, for managing inside transactions and dealing with the system features. Using feedback from SMO personnel, iterations of sprints were employed to continually test and change modules such as supply request workflows, inventory monitoring and reporting systems in response to feedback. The combination of this integration enabled the project to reap the benefits of Waterfall's predictability and order but still retain the flexibility and user-first approach of Agile. Hybrid SDLC method ensured the MRIS was systematically designed, and it met the requirements of its users.

The importance of this study is that it is streamlined to influence efficiency of institutions. The MRIS can model a process that can be adapted to other academic offices and institutions that have similar issues but want to become as efficient as possible with fewer delays in processing, more accountability for staff and personnels, and less human error. The system gives administration accurate and updated data that can assist in making well-informed choices and boosting openness in resource allocation. It streamlines their tasks and optimizes the efficiency of staff and custodians, minimizes manual workload, avoids data entry errors, and lets them focus more on challenging responsibilities. The enhancement of supply handling efficiency results in timely delivery of supplies, which help the faculty and staff, and other personnels in their teaching, learning and daily routine task activities. All these benefits highlight the institutional value of the system and show the possibility of implementing it in other academic institutions which seek modernization in their resource management protocols.

This study only covers the design and development of the MRIS for SMO of Holy Trinity College. It is a system that supplies consumers in the office who are to be assigned with offices in the institution with consumables, equipment etc. needed by them. It simplifies the request and approval process, enhances visibility of inventory, and enables real-time reporting for informed decision making and accountability. Other offices have the fixed assets, equipment maintenance and financial accounting modules in the system. Furthermore, for access to the MRIS, it can only be used by HTC faculty, staff, and other personnels who have office tasks, the private local network will be implemented in the campus. However, future external association, mobile integration, and cloud-based scalability – which are currently not built-in but are in the proposed future enhancements – will be available.

In the study, it is clearly stated what is covered and what is not, and thus what the MRIS directly deals with is in the SMO: Processing requests for these resources, tracking these resources and reporting on them. And what is not covered in the SMO is, in wider institutional resource management, provided by the MRIS. Application of hybrid SDLC adds to the credibility of the study as it will lead to the production of reliable and scalable system, which is a combination of structured methodology and iterative practice.

LITERATURE REVIEW

Good resource management is also a core element of academic institutions, its adequate acquisition, utilization of supplies, facilities or equipment and their accountancy. Its members include the institution's most vital parts, namely the Supply Management Office (SMO) which ensures the continuity of institutional activities and in providing education services. The results of the research, however, have revealed that manual methods are prone to several inefficiencies, inaccurate data and decision making delays. When tracked on paper or on a spreadsheet, institutions have identified issues of transparency and accountability, and productivity and resource optimization. Hence, it is essential to have good inventory management systems which for any sustainable and successful operation is essential.

Automation has proven itself to be a key technology that has, and will continue to solve these problems. Nowadays, systems are created, which are based on web frameworks, databases and code to automate processes and avoid errors. Automated systems can facilitate transactions, improve the visibility of information and assist in real-time monitoring of product flows. The present times are fraught with a lot of technologies, including PHP web frameworks, Cloud databases, and even Internet of Things (IoT), all of which are leveraged to design scalable and user-friendly Inventory Management applications. These sorts of systems can improve productivity and create responsibility in an individual, providing audit trails and self-reporting attributes.

Recent studies have been quite stark in revealing the advantages of automation in inventory management, which is more prominent in different industries. Royani *et al.* (2026) conducted a study on the effects of Artificial Intelligence (AI) on Inventory Management and reviewed the literature available. They had found that the innovations of AI have helped them better predict how much stock to order and more effectively make other crucial business decisions, often over traditional manual approaches. In this era of Industry 4.0, Satra *et al.* (2026) reviewed the practice of automated sorting and inventories system and found that it can help to reduce the operational cost by 20-30 percent and increase the inventory accuracy is up to 35 percent through Internet-of-Things (IoT) based solutions. Antonio pinpointed trends in inventory management systems that are leveraging the Internet of Things (IoT) and how these are providing new visibility and minimizing out of stocks and enabling real-time decision making, but still encounter some challenges with regard to scalability and security.

Herlina, Putri, and Santoso are studying a web-based application for inventory management that can prevent manual mistakes and inaccuracies in inventory management in educational institutions. Purchase articles from publications of the MoldStud Research Team,

which are grounded in PHP, can play vital role in saving development time and increasing the reliability of the system (Andersen & the MoldStud Research Team, 2024). These findings are supported by open-source projects such as LaravelInventoryWithPOS and StocksX (GitHub Community Projects, 2023-2024), which can show how PHP platforms can be utilized and that can effectively manage inventories in real time.

Moreover, the new research indicate that a hybrid Software Development Life Cycle (SDLC) is a hybrid form of Waterfall and Agile software development methodologies. Luca (2022) conducted research that demonstrated how the collaborative aspect of Waterfall's structured approach coupled with Agile's iterative adaptability enhances the flexibility, risk management and alignment amongst stakeholders for complex projects. Knowledge gained from Enterprise Resource Planning (ERP) systems to be implemented in regulated industries further indicates that there is potential to obtain compliance and documentation (BCG Platinion, 2022) with a hybrid compared to a monolithic ERP. The results obtained justify the use of hybrid SDLC approach for building an institutional system like Material Resource Information System (MRIS), to provide methodological rigor and responsiveness of the design towards users' feedback.

In Holy Trinity Collge of General Santos City, however, the manual use of Microsoft Excel and logbooks is still used to complete tasks by the workers from the Supply Management Office. They're very limited tools for basic documentation and can be inefficient and wrong. It is difficult to keep track of what the Property Custodian receives, relinquishes, breaks and/or replaces and ability to produce reports in a timely fashion. These problems are similar in general to those given in the other general studies but are not solved in the context of the College's activities. This institution has not yet had an automated system which makes it difficult to be able to manage the resources in a transparent and sensitive manner, therefore a local technological solution is needed.

While the benefits of automation have been shown in the past, these studies do not yet specifically design the instructions to the workflow of the Academic Supply Management Offices (ASMO) in the Philippines. The idea behind the breakout is that the requests for approval, inventory, as well as reporting should all be handled with a single application. This study is a gap fulfilling one as it brings in a solution of utilizing Material Resource Information System (MRIS) created in the CakePHP Framework (Cake Software Foundation, 2020) yet it ought to automation the material purchasing, promoting and library process. Overall, the MRIS helps to make the operations and procedures in the Supply Management Office more effective, reliable and transparent and it seeks to enhance the management of the institutional resources to support more open and transparent institutional operations.

MATERIALS AND METHODS

This chapter presents the methodology of developing the Material Resource Information System (MRIS) for the Supply Management Office (SMO) of Holy Trinity College of General Santos City. The Hybrid Software Development Life Cycle (HSDLC) was used in the study which involves a combination of both Waterfall and Agile software development model. The entire project has been implemented according to Waterfall by documenting each step of the waterfall and according to Agile Model by considering each step of the waterfall as a Sprint to inject the user's feedback and iterations in the waterfall. The combination made it possible to predictability and adaptability for the robust, user-focused and institutional responsive MRIS.

The Waterfall Model, which governs at the macro level, and the Agile Model, which governs at the micro level in the implementation phase were shown in a Hybrid SDLC through Figure 1 in this study. The linear and sequential characteristics of the Waterfall model from the requirement to deploy are easy, easily understood, and change recovery process is simple. Agile is not Waterfall model, it gives the flexibility and the ability to group together a number of waterfall components: Plan, Build, Test and Review.

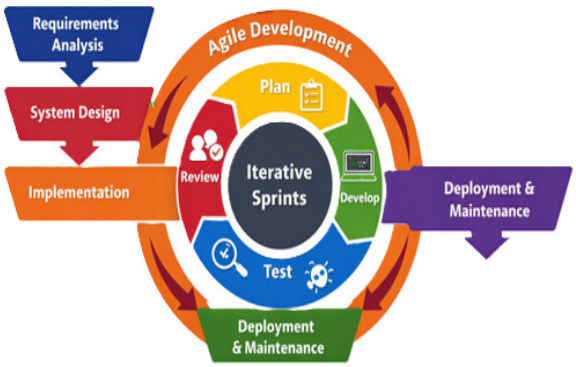

Figure 1: Hybrid SDLC Model for Material Resource Information System

This is the representation of Hybrid Software Development Life Cycle (SDLC), used in the case of Material Resource Information System (MRIS). It is based on the Waterfall Model and includes and inherits the sequential nature of Requirements Analysis, System Design, Implementation and Deployment & Maintenance. During the Implementation phase the following steps from the Agile Model are executed and the internal transactions and the features of the system are developed, tested and reviewed in an iterative way: Plan, Develop, Test and Review. Its systematic way of working, as in the Waterfall scheme, is complemented (not compromised!) by working which is in the spirit of Agile: being adaptive and responsive to the user feedback on an optimum basis during coding.

Analysis Phase

In this period the researcher detected the problems facing in SMO. Filling forms by hand, dealing with inventory, and creating reports led to delayed responses, as well as the loss of Supply Management Office Request form. The results analyzed confirm the need for automation – create a system that quickly accepts requests, maintains an up-to-date inventory and delivers real-time reports. Following the requirements were gathered from SMO staff, the requirements were used to create the functional and non-functional specifications of the system.

Design Phase

The design phase consisted of two principal parts, logical design and physical design.

Logical design

Logical design was emphasized on the specification of the data structure (definition) and relationship used for modelling the business processes of Supply Management Office (SMO). To emphasize the conceptual frame of the system at a high-level, the study has first developed a Conceptual Framework (IPO Model) to depict the structure (of the inputs, processes and outputs) at a high-level.

The IPO framework shows the transition from manual supply management processes to automated processes. Current problems are found in the input stage, such as

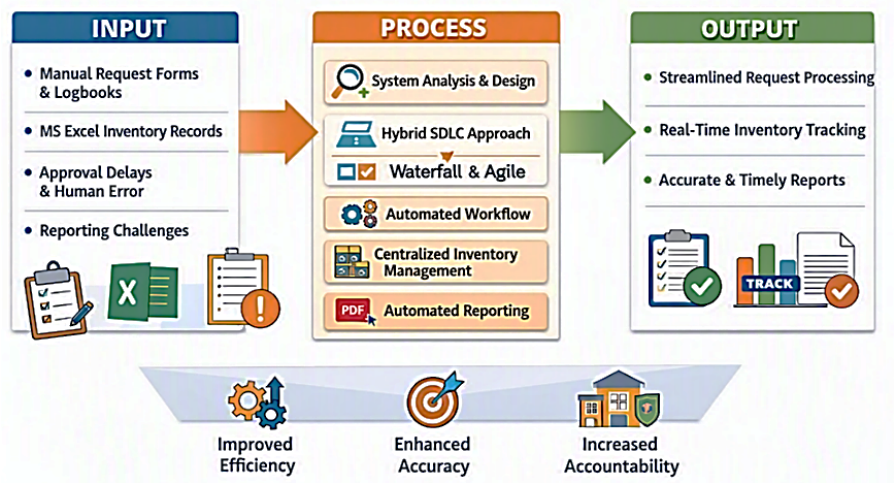

Figure 2: Input–Process–Output (IPO) Conceptual Framework of MRIS

delayed request forms, logbooks and spreadsheet records, which are susceptible to human error. Process stage is a process through which the system is developed using a mix of structured documentation of Waterfall Model and Agile Sprint refinement which is guided by Hybrid SDLC. This ensured that modules like workflow automation, user inputs and inventory monitoring/reporting were consolidated and synchronized. The current focus is on the benefits, including faster handling of requests, up-to-date inventory management, faster and more accurate reporting for greater accountability and informed decision making.

The study placed the IPO structure in Logical Design stage providing a conceptual understanding of the operation of the MRIS. This conceptual flow was further broken down in logical artifacts like Entity Relationship Diagram (ERD), Use Case Diagram and Class Diagram. This shows you the logical structure of the MRIS database, in terms of the entities that will have to be linked together and the relationship between the entities: Users are linked together with departments; persons, requests, items and suppliers are linked to each other, and orderinfos are linked to persons. Various tables/modules will be inter-dependent in the system and Foreign key will be used to ensure consistency and integrity for various tables. All the following Table will be used in the system and Foreign key will be provided in each table for consistency and integrity. While the ERD is a guide to how the database will be implemented, there are other aspects concerning the use of the system that benefit from it such as inventory, requests, reports etc., which are used on a large scale.

Physical Design

The Logical design gave the blueprint for the interaction of data and processes in the Material Resource Information System (MRIS), while the Physical design looked at the actual technology and software used to build the system to ensure it was functional, secure and user friendly. This stage involved transforming conceptual and logical models to real and tangible parts to be deployed and tested in the actual environment.

The MRIS has been developed using CakePHP Framework—an open-source PHP framework that is based on the Ruby on Rails framework. CakePHP follows the design patterns of Model-View-Controller (MVC) and Object Relational Mapping (ORM) which separate issues into different layers — data, business logic and user interface. Its "bake" script generated CRUD (Create, Read, Update, Delete) operations were automatically generated and built-in helpers like HTML, Ajax, Form, Paginator, and JavaScript helped to speed

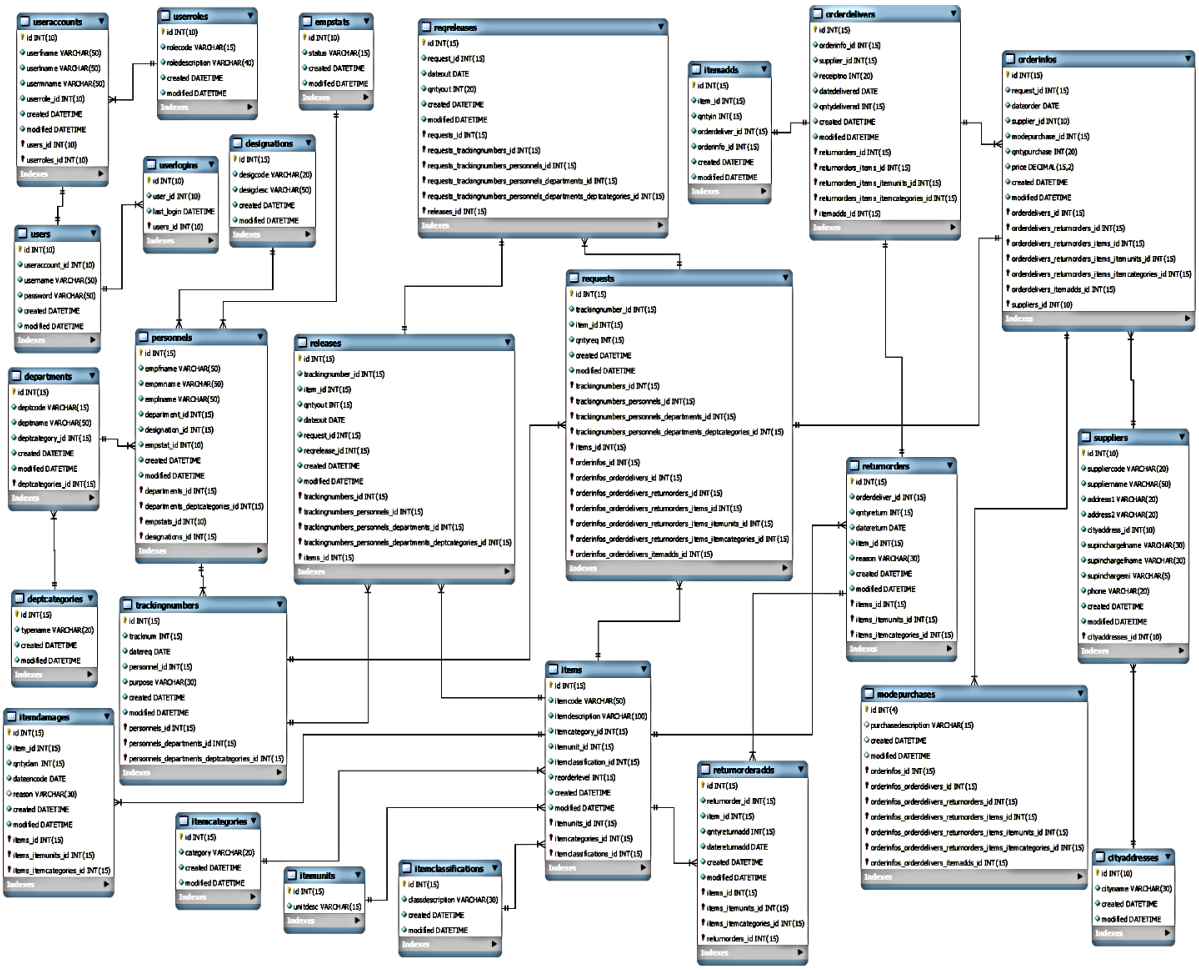

Figure 3: The Entity-Relationship Diagram (ERD) of MRIS

up development. The system was further improved with the addition of Authorization and Authentication plugin, ServerRequest object, Mailer class & Session handler that further strengthened the security and flexibility of the system.

The server was set up on a local development platform called XAMPP. This cross-platform distribution contains all of the software that is required for dynamic Web pages: Apache, MySQL, PHP, and Perl. The following server-side environment was set up to develop and test MRIS modules prior to deployment.

It used AJAX (asynchronous JavaScript and XML) for enhancing the responsiveness where data is exchanged between the client and server without loading the whole page. This resulted in improved user experience, especially in features like inventory monitoring and request approvals, where up-to-the-minute information was critical.

The system utilizes the TCPDF library for reporting, so they could generate professional and printable PDF reports from the MRIS. Complete, secure and ready-to-use reports like inventory summary, item classification or purchase request, with support for UTF-8 and Unicode, XHTML, printing barcodes, digital signatures and more, with the physical design of the MRIS was based on these technologies. This system was designed from conceptual and logical frameworks, addressing the need of Supply Management Office's operating needs, is functional and incorporates the following features: CakePHP Structured Framework, XAMPP server environment, AJAX responsiveness and TC PDF reports.

At this stage, the study could now safely move into the Implementation Phase after two successful stages, the Conceptual Design and the Logical Design and the technologies covered by Physical Design. The design blueprints and the automated workflows, centralized inventory management and reporting were integrated to build the Material Resource Information System (MRIS) at this stage. The structured outputs of the Waterfall design were broken down to addressable modules, and the Agile iterations were improved using feedback from users at the Supply Management Office. This not only gave them a technically functional system, but a one that would work for their institution's operations.

Implementation Phase

The study went to the Implementation Phase after the Design Phase, which involves developing and implementing the conceptual and logical designs into a system. The technical designs evolved into a working

system; the whole study was taken over at the Design Phase and hence it was moved to the Implementation Phase. In this phase the coding in a concrete way, module integration, and repetition and refinement were based on the hybrid Software Development Life Cycle (SDLC) were performed.

The initial phase of development was aimed at creating the basic modules for the Material Resource Information System (MRIS) that is being developed with CakePHP. Using a "bake" script enabled the creation of CRUD operations for different types of data, including users, departments, items, requests, releases, suppliers, and order information, which helped to ensure uniform and efficient interaction with the data. It was enhanced by adding AJAX to make the application more responsive and to update the display of those quantities in-stock and whether the request has been approved or not as the transaction is processed, rather than having to refresh the entire page.

Work was being done in parallel with testing and coding, in line with Agile Methodology. A planning, development, testing and review activity was carried out, each with a set of activities during each Sprint cycle, with a specific module being identified (e.g., workflow for requesting supplies, inventory tracking, reporting system). As each Sprint was completed, input from SMO staff was considered and changes and refinements were implemented in a timely fashion. This was an incremental process, which stayed focused on the user needs and included specific milestones from the Waterfall process.

Individual functions were validated in unit testing, and modules were integrated together and tested in integration testing. All the reports generated by the TCPDF library have been validated, formatted and secured with digital signature & barcode printing features. The opportunities for error identification and error correction were early throughout the cycles; thus, a low risk and a high degree of system reliability was achieved.

The Testing and Evaluation Phase was the next phase of the study, this phase intended to test and evaluate the developed system with the desired functions and requirements of the Supply Management Office (SMO). This stage also included reliability, technical validation and user-centered testing; which endowed it with usability.

Each module was tested with Functional Testing to ensure that the functionality is correct. The one-by-one uses the concept of testing the requests (de facto), updates inventories or generates reports and was proven correct in unit tests. Integration testing, which tested the ability of the modules to get along and the flow of data amongst user accounts, departments, items, requests and suppliers, verified that they did get along and play nice.

For Performance Evaluation, it was the issues of responsiveness and efficiency of the system. Testing of AJAX was performed to ensure that updates were made in real time without the need of reloading the page as well as the accuracy, formatting and security of the TCPDF reporting feature. This was used to test it for the number of requests it could process and if it was stable under general operation.

User Acceptance Testing (UAT) done with the SMO administrators, staff and custodians. The participants were needed to perform different activities including order placing, transaction approval, stock level confirmation etc., regularly. Problems in using the instrument, the ease of operation and overall satisfaction were inquired. All this feedback was harnessed for the required change incrementally based upon the philosophies of Agile.

Feedback Analysis found that users valued the ease of the request procedure, the number of manual errors eliminated and that the reports were sent on time. Staff appreciated having fewer workloads because of the inventory integration and administrators appreciated the transparency they received on how the resources are being used. This result verified that the MRIS has been able to solve the inefficiencies pointed out in the problem statement.

It has therefore been tested and assessed, and the findings were quite encouraging in that area as it assisted in improving the efficiency, accuracy and accountability of the operations related to supply management. In the validation phase it is found that Waterfall is a structured discipline and is supported with complementing the Agile approach which is user friendly, and it is concluded that the system created is technically feasible and user friendly.

Deployment and Maintenance

After successful testing and validation, in Deployment and Maintenance phase MRIS was performed. This was a move to guarantee the long-term use of the new system and ensure that installation, configuration and the required maintenance of the new system were correct.

Deployment Plan

After all, the other ingredients of SDLC, the Deployment Phase took place, where the Material Resource Information System (MRIS) was deployed, configured and introduced practically in the Supply Management Office (SMO) of Holy Trinity College. This smooth transfer from development to the operations phase was effective during this phase.

The MRIS was successfully installed after deploying it in the local server of the institution by using XAMPP software for the installation process. The schema for the database and application files was deployed, and the configuration was optimized to fit into the campus network infrastructure. Security mechanisms such as authenticating and authorizing users, to safeguard the information contained in the user accounts and valuable items were provided.

Administrators, Custodians and Staff directly involved with the system were provided training. In these sessions, explanation of request process, Inventory monitoring and report generation were explained. Hands-on exercises with the modules were made available to enable the employees

to practice on the modules, and the training documentation (user's manuals and quick reference guides) were provided to help with future trainings.

The roll-out was done in stages to ensure minimization of disruption. The basic functions of request, approval of supplies were the first to be addressed and then works were broadened to include monitoring and reporting of inventory. Some feedback to guide rollout has been accepted and the odd modifications have been incorporated to make the rollout more user-friendly and to resolve operational problems. The gradual roll-out enabled gradual adoption of the new system and the continuity in the activities of supply management.

The end of the deployment phase coincided with the start of the MRIS (which became part of the Supply Management Office's routine). Request processing might be possible in higher speed, real-time stock monitoring or correct reporting may be created easily. Installation, training and roll-out was successful, and the development process led to the creation of an operational solution that clearly removed the inefficiencies that arose in the manual process and promoted accountability better managed resources.

Maintenance Plan

After installing the system, the study found the need to maintain the system for its long-term reliability and usability which is called the Material Resource Information System (MRIS). This encompassed regular database backups to be sure institutional data was safe, monitoring server performance, implementing security patches, software updates (including CakePHP, TCPDF etc.). These were important considerations that were mentioned during the review of user accounts and access privileges as needed, to ensure the procedures for security are followed on their way, and the minor bug that are encountered everyday are fixed on the spot.

Beside the problem that occurred during the maintenance process some ideas for improvement and development are also found during the study. These included expanding the system to provide fixed asset and equipment management and adding financial modules for tracking finances, as well as making the system cloud-based to enable remote users to access it. Mobile applications were seen as an avenue of improving access to the faculty and staff, and so it became recognized as a scheme. Also, integration with advanced analytics and dashboard capability can be included to offer more insight to the administrators on the utilization and procurement pattern of the resources.

Now, the MRIS is developed to address the inefficiency witnessed and can be further expanded based on future costs and requirements for improvement. Forward-looking thinking of the system keeps it relevant, secure and adaptable to new technologies and evolving business requirements.

This was a structured flexible method of studies as Design, Implementation, Test and Evaluation, Deployment and Maintenance were part of Software Development Life Cycle. From the conceptual and logical design to the formulation of clear framework of using the Material Resource Information System (MRIS) to replace the manual process the study started from there. Then, it was physically modeled by transforming the model into real technologies and/or physically it was implemented by programming, integration and improvement of the system. It has been proven and verified to be usable and functional: deployment allowed for a smooth hand over hand transfer to institutional practice – installation, training and roll-out. In the end, system improvements and maintenance were offered adding a touch of sustainability to the system. All these stages ensured both the technical feasibility of the MRIS, and its ability to reach the requirements of the Supply Management Office.

After developing the methodology, the results and the discussion section will be the next one where the performance of the system will be emphasized and the user feedback from the users of the system will be obtained and how well the MRIS was able to overcome inefficiencies highlighted in the problem statement will be highlighted.

RESULTS AND DISCUSSION

Improvements on the substantial operations were observed within the Holy Trinity College of General Santos City (HTCGSC) in the field of Order of Operations in Supply management with the development and deployment of MRIS. Based on the results obtained, the system has proven to be effective in solving the inefficiencies mentioned in the problem statement, which include areas like request processing, stock tracking, and reporting. By simplifying the workflows, automated tools alleviated delays in approvals; inventory management was streamlined, limiting human errors; and PDF reporting integrated seamlessly into the workflows, ensuring timely and accurate documentation. These results, coupled with user feedback and testing, highlight the effectiveness of the system, as well as any enhancements needed. As for productivity assessment to determine the effectiveness of the implementation, the results were conclusive and reaffirm the success in achieving the goals of this study that make the hybrid SDLC approach effective in achieving a technically sound and institutionally responsive system.

However, inefficiencies in manual work in the Supply Management Office (SMO) were resolved after the development and implementation of the Material Resource Information System (MRIS) were done in Holy Trinity College of General Santos City. The previous process was based on paper request forms, logbook and spreadsheets – and sometimes failed to provide for timely reporting, tracking of stock movement and delays. Requesting and managing supplies automatically, XAMPP of Apache Friends (2020) webserver package, Apache Software Foundation (2020) and the CakePHP framework from Cake Software Foundation (2020) providing integrated reporting that includes reports from Adobe Dreamweaver version 21.8 of Adobe Inc (2026).

It was implemented on a private local network, which

allows access to the system just to HTC personnel. It allowed those who had requested supplies to order from the SMO office page instead of having to go to the office first and then check the order tracking for updates until the supplies were picked up as they were ready; it allowed the orders to be checked on the SMO website by the person who ordered them when the supplies were ready. In CakePHP Documentation (2020), by using Bake Shell, it was possible to create efficient CRUD operations, and built in Helpers for HTML, Forms, Pagination, AJAX and Javascript further enhanced the level of usability. AJAX (Mozilla Developer Network, 2020) made operations more responsive and TcLibPdf (2020) allowed PDF reports to be made accurately.

The developed system was checked with two (2) instruments. The first one was the survey for 'user interface usability evaluation with web-based questionnaires' by Perlman (2020), that evaluated the usability of the system by the means of the unified questionnaires, including the Questionnaire for User Interface Satisfaction (QUIS), Perceived Usefulness (PUEU), and Usability: Usefulness, Satisfaction and Ease of Use (USE). The second one is the Software Evaluation Criteria of National Career development Association (NCA) developed in 2020 which evaluated five criteria of a program: information content, career development process, user interaction, technical aspects, and materials/support services.

The subjects studied were the Property Custodian, and everyone was involved in staff of the SMO, and the HTC who have their room in the institution in random. They were given the freedom to assess the system according to their experience. Ratings were based on a five-point scale; scores from 1.00 to 1.99 were indicated as Poor, 2.00 to 2.99 Fair, 3.00 to 3.99 Good, 4.00 to 4.99 Very Good, and a perfect 5.00 was rated as Excellent. These criteria include utility and usability, user satisfaction and functionality. These criteria can be used to evaluate the system and user acceptance to the system. There was a random mix of HTC employees mixed in with the evaluation results, which is a plus because the evaluators weren't only on the Supply Management Team, but came from a diverse group of end user HTC employees who use the system as part of their workday.

Table 1: Assessment Results

Criteria	Average Mean	Descriptive Rating
Usefulness and Ease to use	4.71	Very Good
User satisfaction	4.55	Very Good
Functionality	4.68	Very Good
Usability	4.43	Very Good

The overall mean rating for the evaluation results in MRIS was found to be Very Good in the descriptive rating with the numerical equivalent of 4.59. Assessment results for detailed are shown in Table 1 with consistently high results at all categories.

These results are in line with the benefits of the system with delay reduction, paperwork reduction, accuracy in inventory monitoring and timely and reliable reporting. The end users seemed to be very satisfied with this MRIS due to its usability and functionality scores.

The results also lead to the importance of MRIS as a tool to encourage better management of institutional resources. According to Royani (2026) and Satra (2026) states that automation and centralized control are in line with recent studies highlighting the benefits of smart and IoT technologies in inventory management for greater accuracy and cost-efficiency. Unlike the other web-based inventory application that has been previously developed by the same research team previously, Herlina (2024), Putri (2024), Santoso (2024) which is only focused on data accuracy, the MRIS contains new and improvements features such as NCR, approval workflows, PDF-based reporting and more, which gives more transparency and accountability in academic operations.

As suggested by Luca (2022) and BCG Platinion (2022), the hybrid SDLC model (structured approach with Waterfall and dynamic approach with Agile) turned out to be successful in generating a system which could be methodically designed and dynamically adapted to users' suggestions.

This MRIS is designed to provide solution to an environment that is geared towards the educational landscape in the Philippines where manual inventory is still prevalent. It will provide the real-time visibility, be easy to scale, secure, based on campus, and be designed for open-source operations. The MRIS also introduces an improved level of automation in the process of reporting and approving documents as compared with the previous reporting systems and it is a template for modernization of educational resources.

The MRIS is important for outlining the path to a more pragmatic and visionary digital resources management future in the face of recent changes in this field. This work fills the need for the institutions and is a step towards further studies on scalability and the integration of the system with new technologies like AI forecasting and IoT asset tracking.

The results of this study clearly support the objectives as they indicated increase of efficiency, accuracy and accountability in the Supply Management Office due to the implementation of MRIS. The whole system streamlined the process of making supply requests, managed inventory and guaranteed precise reporting, all while moving past the

manual obstacles and boosting benefits in terms of usability and usefulness. The results of evaluating the MRIS provide confirmation that MRIS is effective as well as relevance in the institutional context and provide a practical scenario to management of academic resources. The system is being deployed locally, but there is a need for its success to be extended and more improvements included, such as: integration with mobile platform, implementation of AI-based analytics and scalability through cloud solutions to reinforce the knowledge and decision-making process across the entire system.

CONCLUSION

The inefficiencies existing when doing the manual processes in the Supply Management Office were greatly reduced by the development and implementation of the Material Resource Information System at Holy Trinity College of General Santos City. A set of problems that were experienced by the Supply Management Office (SMO) in the manual processes were identified and were presumed to be solved with the development and implementation of the Material Resource Information System (MRIS) at Holy Trinity College of General Santos City. This was achieved by automating purchasing systems, rationalizing stock management and streamlining reporting to be accurate, avoid bureaucracy and to speed up decision making. It was used in a secure local network and enhanced access and accountability in the institution. The system was evaluated and revealed excellent usefulness and reliability as well as the potential to assist in optimizing the use of the available resources and promoting the visibility of operations.

One of the most notable findings of this study is 'Web facilitation in administrative procedure' which can contribute efficiency and consistency in data. This system was effective in the local context, but in the future system should be enhanced to be able to scale in the cloud and be integrated with the external systems as well. The results of this study are also applicable to other educational organizations which intend to adopt an automated tendering system to support their procurement. A simple digital-transformation model for use with educational resources is adopted and used in the system constructed. The use of the system is an application of digital transformation for learning. The optimization of the institutional decision-making process and sustainability is also recommended for future improvement, along with the integration of real-time analytics, mobile access and the integration of AI-driven forecasting into the process.

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