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Integrated Application for Optimizing Budget Management and Procurement of Consumables in Laboratories in Educational Institutions Using Odoo

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ABSTRACT

Laboratory management in Educational Institutions is important to support students' practical learning because laboratories are a means for students to delve into the material directly. An important aspect of laboratory management is budget management and consumables. Not a few Educational Institutions use spreadsheets to manage the budget and procurement of Consumables, which are often inefficient and poorly integrated. These limitations make it difficult to monitor budgets and the status of goods requests in real-time, hinder transparency, and increase the risk of human error, which can ultimately reduce accountability in laboratory management. This research aims to develop a more integrated budget management and procurement system for Consumables using Enterprise Resource Planning (ERP) with Odoo software, involving the Accounting and Purchase modules. The QuickStart method is used to ensure smooth implementation by actively involving users throughout the development cycle. This system includes budget creation and monitoring, purchase order creation, and validation of goods received. The results of the Black Box Testing and Expert Judgement show that the developed system has met all the testing objectives, although improvements are still needed, such as the addition of graphs for budget visualization. The implementation of this system is expected to increase transparency and accountability in budget management and procurement of consumables in educational institutions.

Introduction

Educational institutions have an important role in improving students' knowledge and skills through the use of various learning methods, both theoretical and practical. One of the important elements in this process is the laboratory, which serves as a means to delve into the material firsthand (Hardianti & Guntur, 2021). A laboratory is a place where students are trained to develop their skills through practice, demonstration,

experimentation, research, and scientific development. All activities carried out in the laboratory such as practicum, observation, research, and development of learning models, are carried out to support teaching and learning activities (Riyadi, 2019).

For activities in the laboratory to run smoothly, a laboratory unit was formed that is responsible for the overall management of the laboratory, including the management of budgets, laboratory assets, and consumables (BHP), as well as supervision of every activity carried out. (Ramadhani, 2020).

Laboratory management in Educational Institutions is very important to support the learning process. One of the most important aspects is budget management and Consumables. Not a few educational institutions today use simple software such as Spreadsheet for this management. (Furqorina, Triandika, Syarif, Mahardika, & Wulandari, 2023). However, this becomes inefficient, as Spreadsheet has weaknesses, especially in terms of data integration that makes it difficult to monitor budgets and the status of Consumable requests. real-time (Astutik & Muzakkir, 2020).

The problems that are often faced include the inability to recap data consistently due to limited time in the procurement process. This results in difficulties in monitoring the status of goods requests, whether they are still in process, have been completed, or have not been processed at all. In addition, Spreadsheet does not have an adequate integrated system, so if there are any unrecorded data gaps, then it is difficult to keep track of them. Unable to keep track of who requested goods, lack of alerts against deadlines for item requests, and prone to human error. This can result in inaccuracies in budget management and recording of the procurement of Consumables. These limitations not only reduce efficiency but also hinder transparency and accountability in laboratory management.

To increase transparency and accountability in laboratory management, educational institutions need to implement a more sophisticated and integrated system. The system must be able to record every transaction and request for goods in real time so that all interested parties can easily access information related to budget management and procurement of Consumables. Therefore, the implementation of Enterprise Resource Planning (ERP) technology and supporting applications such as Odoo is needed.

Table 1
System Implementation

Scientific	Definition	Linkages
Enterprise Resource Planning (ERP)	An information system model that allows an organization to automate and integrate its key business processes. ERP is designed to support a wide range of enterprise functions, allowing companies to operate more efficiently (Nur Wulandari Dewi Ayu, Anggraeni Sita, & Simon, 2020).	ERP provides an adequate integrated system, can record every transaction and request for goods in real-time, can track who requests goods, and provide alerts against deadlines for requests for goods.
Software Odoo	Platform open source designed for business purposes, offering	Odoo provides modules that suit the needs of laboratory

	integrated modules that can be tailored to the specific needs of the Company (Suminten, 2019).	management, allow for better integration of data between modules, are user-friendly and accessible online, and enable collaboration between users.

One of the methods that can be used to implement software Odoo is the QuickStart method. This method aims to ensure a smooth implementation process by involving users actively throughout the development cycle. This method allows users to provide input as well as understand the system developed. (Rahmi, 2021).

This research is different from previous research that only focused on ERP implementation in general. This research develops an Odoo-based budget management and Consumables procurement system with the QuickStart method, providing a practical solution for many Educational Institutions. The implementation of the Accounting and Purchase module is expected to overcome the limitations of management that still uses Spreadsheets and improve the efficiency of budget management and procurement of Consumables.

Research Methods

Figure 1 is a diagram of the research systematics that illustrates the differences of each activity. The systematics of this study has four different stages of activity, including; The first stage, Strategic Planning the stage of analyzing current business processes to be used as a reference for implementation. The second stage, Business Analysis is the stage of analyzing the current business process before starting development. The third stage, Gap Analysis is a stage of comparing current business processes with those proposed for improvement. The fourth stage, Testing as the stage ensures the development of configurations and testing by the objectives.

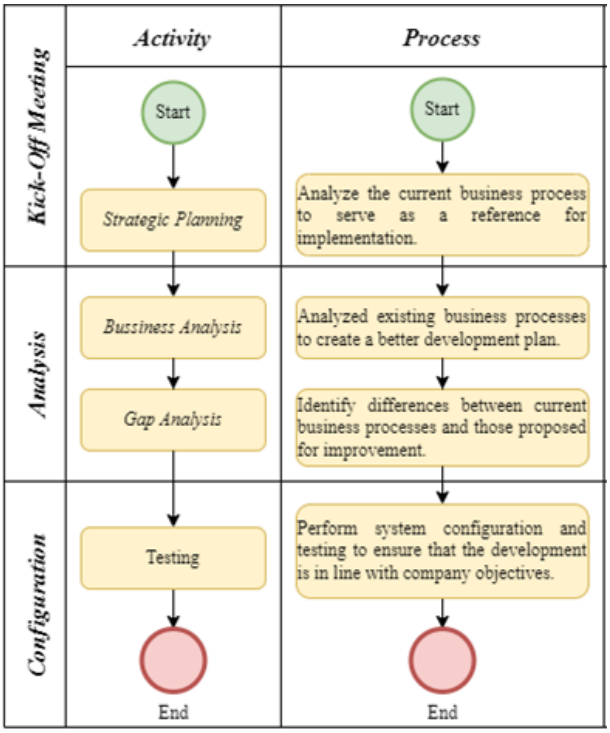

Figure 1 Research Systematics

QuickStart Method

QuickStart is one of the methods that can be applied to implement software Odoo. This method is designed to ensure that the implementation process is carried out comprehensively. (Indriyani, Budiono, & Witjaksono, 2021). Based on Figure 2, there are four stages in the QuickStart. The first stage is a kick-off call to identify the needs of stakeholders. The second analysis is to identify existing business processes as a reference for targeting. Third configuration Conduct a review of the flow of the Odoo system according to specific needs based on the gaps analysis that has been done. Fourth production focuses on application implementation including installation and configuration that has been developed and tested. (Nafianto, Puspitasari, & Saputra, 2019).

Figure 2 Stages of Methodology

Black Box Testing

Black Box Testing is a test method that verifies the results of application execution based on test data input, to ensure that the functionality of the application is by the set requirements. (Febrian, Ramadhan, Faisal, & Saifudin, 2020). Three stages are carried out, namely; making a test case for testing functions, creating a test case to test the suitability of the program's functions to the needs and demands of users, and searching for bugs/errors. (Siagian, 2019).

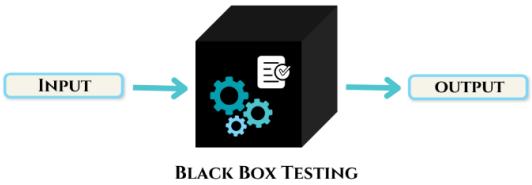

Figure 3 Black Box Testing

The method used in this Black Box Testing is Equivalence Partitions. The Equivalence Partitions method is a testing technique that is carried out based on input data on each form in the performance appraisal information system. In this method, each input menu is tested and grouped according to its function to determine whether the results are appropriate or not as expected. (Trengginaz & Yusup, 2020).

Expert Judgement

Expert Judgement is a testing method to collect information from experts. By utilizing the assessment of experts, it is possible to obtain views and advice from individuals who have specialized knowledge in a particular field, which can help in the decision-making process. (Stander, Cohen, Harrison, & Broadhurst, 2023).

The scale that will be used in the Expert Judgement of this research is the Likert Scale. The Likert scale is a psychometric scale that is commonly used in questionnaires and is the most widely used scale in survey research. (Taluke, Lakat, Sembel, Mangrove, & Bahwa, 2019). The following is a table of the accumulator index Expert Judgement. The following is a table of the accumulator index Expert Judgement.

Table 2
Likert Scale

Score	Assessment Scale
5	Excellent
4	Good
3	Pretty Good
2	Bad
1	Very Bad

Results and Discussion

At this stage, an analysis of laboratory needs in educational institutions related to research on the configuration of budget management systems for the procurement of consumables is carried out.

Strategic Planning

Strategic Planning shows that many Educational Institutions currently use Spreadsheets to manage budgets and procurement of Consumables, but the data is not yet integrated.

Table 3
Strategic Planning

Milieu	Development	Basic Knowledge
Already using Spreadsheet for budget management and	Implementation of the Enterprise Resource Planning (ERP) system for budget	Enterprise Resource Planning (ERP). Accounting system design.

procurement of Consumables. However, the system does not yet have adequate integration with other modules.	management for the procurement of Consumables using Odoo 15.0 software.	Purchase system design.

Based on Table 3, a system is needed that can integrate budget management and procurement of consumables, such as the implementation of an Enterprise Resource Planning (ERP) system using Odoo 15.0. As well as a basic understanding of ERP processes and systems, an Accounting module for budget management, and a Purchase module for the procurement of Consumables so that the implementation runs well.

Business Need Analysis

Focuses on analyzing current business processes to identify shortcomings in existing flows. The results of this analysis are expected to be the basis for improvements in the design of the proposed business processes.

Budget Management

Figure 4 shows information about the existing business process flow of budget management. This process starts with the Head of Laboratory Affairs making a budget plan for various categories including BHP and having discussions with the Head of Study Programs. The Head of the Study Program will provide input on the draft budget that has been prepared. Then the Head of Laboratory Affairs prepares the final budget based on the results of the discussion and sends the final budget to be submitted. The Head of the Study Program re-examines the final budget before it is submitted whether there is a revision or not. If so, then the Head of Laboratory Affairs will rearrange the final budget. If not, then the Head of the Study Program submits the final budget document to the University Finance. The University's Finance will submit the approval of the final budget along with the nominal budget to the Head of the Study Program. Then the Head of Laboratory Affairs monitors the use of the budget periodically so that it is efficient and effective.

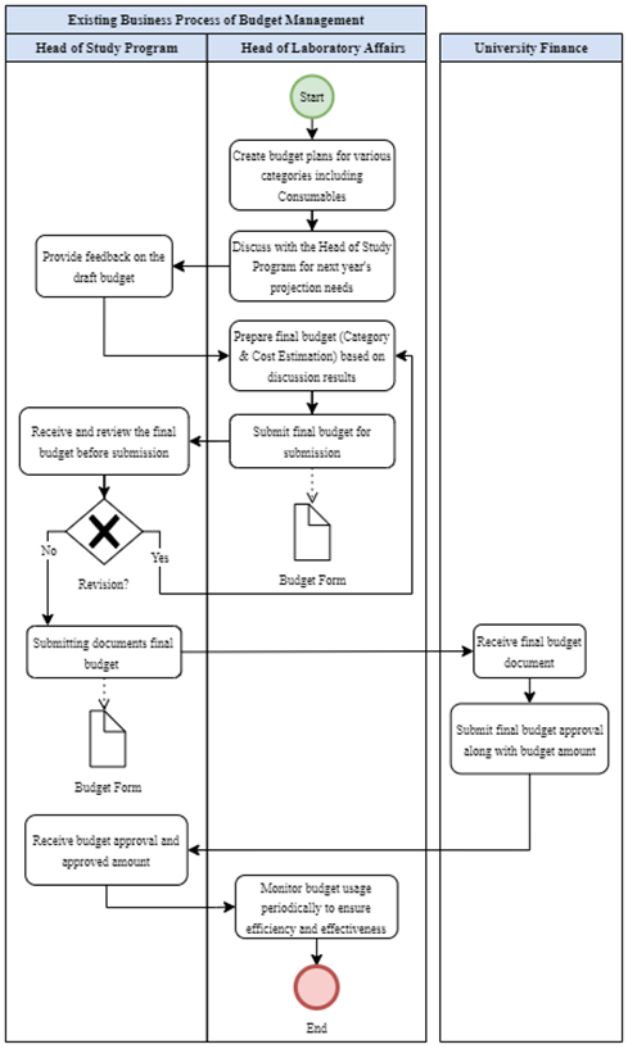

Figure 4 Existing Business Process of Budget Management

Procurement of Consumables

Figure 5 shows information about the existing business process flow of procurement of Consumables. This process starts with the Laboratory Assistant making a list of BHP needs requests and submitting them to the Head of Laboratory Affairs. Then the Head of Laboratory Affairs checks whether the request is by the needs or not. If it is not suitable, the Laboratory Assistant must resubmit the revised list of item requests. If appropriate, then the Laboratory Staff will check the availability of the proposed BHP in the laboratory warehouse. If the goods are available, the Laboratory Staff will remove the goods from the warehouse according to the proposed needs and give them to the Laboratory Assistant. If the goods are not available, the Laboratory Staff makes an order based on the results of the availability check and sends it to the Vendor. After the goods arrive, the Laboratory Staff will check the condition and quantity of the goods received and record them in the laboratory warehouse inventory. Then the Laboratory Staff takes out the goods according to the proposed needs and gives them to the Laboratory Assistant.

After receiving the goods, the Laboratory Assistant fills out the goods handover form and the Laboratory Staff will update the stock of goods.

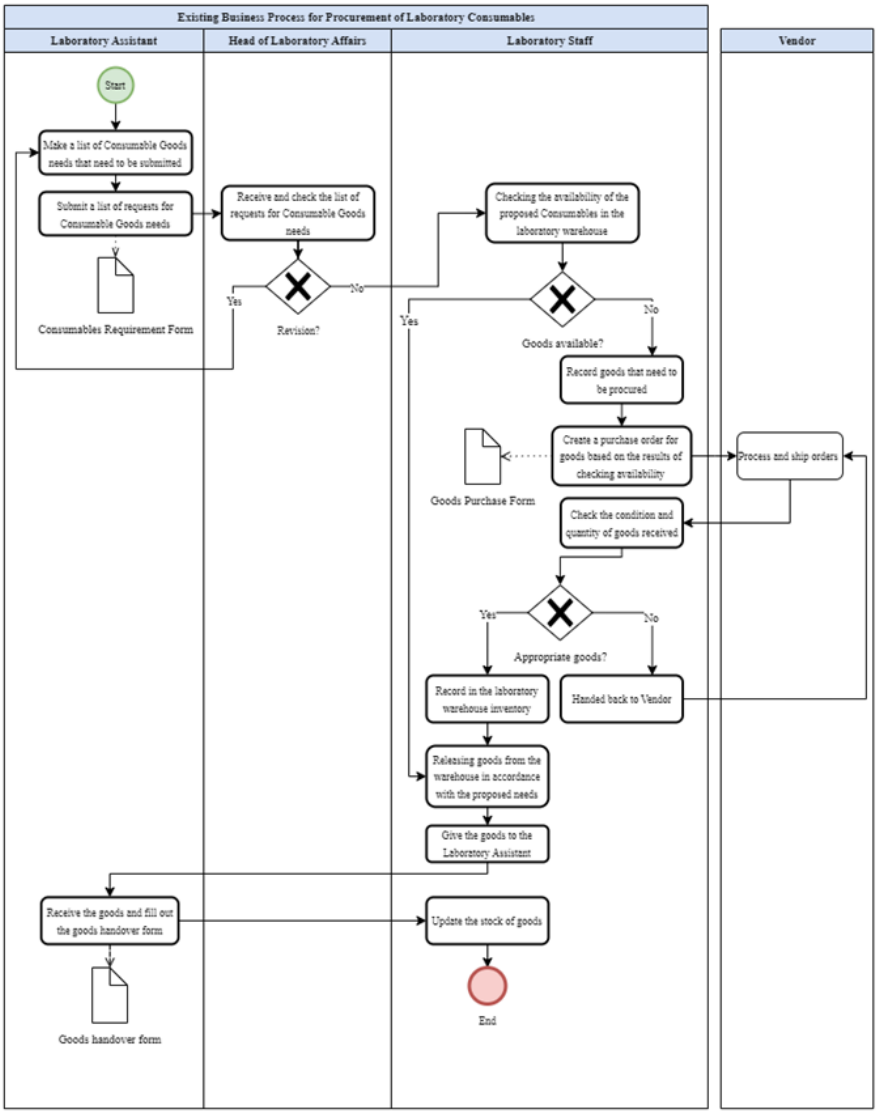

Figure 5 Existing Business Process of Procurement of Consumables

Fit Gap Analysis

Table 4 shows a comparison of the current business processes with the proposed ones. Fulfillment in Fit Gap Analysis is divided into three, namely; Null (N) means that the business process is not yet using Odoo. Partial (P) which means that the business process has been using Odoo but needs improvement. Full (F) which means that the business process has fully used Odoo (Nurhasanah, 2023).

Table 4
Fit/Gap Analysis

Business Process	Necessity	Fulfillment			Solution
		N	P	F	
Budget Management	An integrated system is needed to monitor the budget in real time and	√			A system that can record every transaction, validate vendor bills, and

	record every Consumables purchase transaction.		generate direct financial reports.
Procurement of Consumables	An integrated system is needed to monitor the status of goods requests and track requesters.	√	A system that can make procurement easier, integrated for automatic stock updates, and financial accuracy.

Budget Management

Figure 6 shows information about the proposed business process flow of budget management. This process starts with the Head of Laboratory Affairs making a budget plan for various categories including Consumables and submitting confirmation of the budget plan to the Head of the Study Program. The Head of the Study Program will check whether the budget needs to be revised or not. If so, then the Head of Laboratory Affairs must correct the budget and send it back. If not, then the Head of the Study Program will confirm the budget and submit approval to the University Finance. If the budget and nominal have been approved, the Head of the Study Program and the Head of Laboratory Affairs will monitor the use of the budget periodically to be efficient and effective.

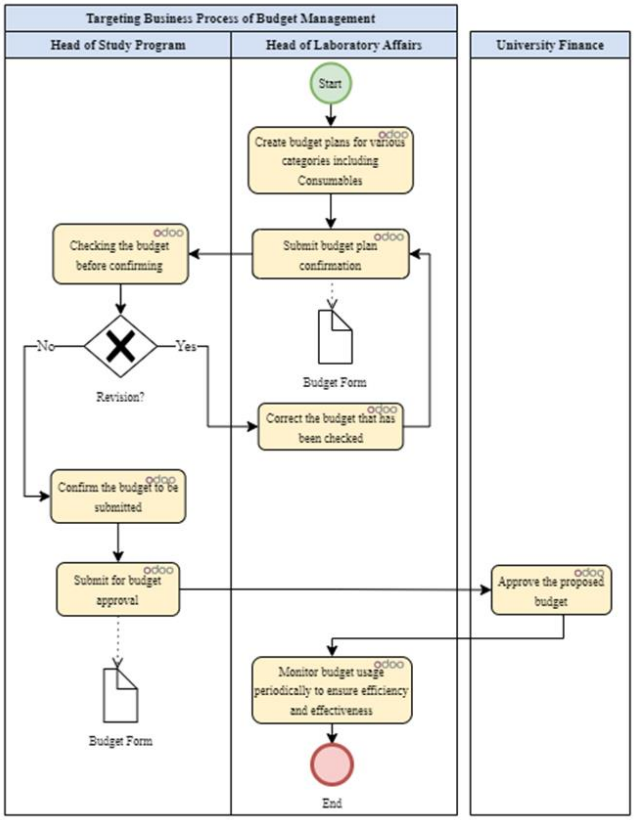

Figure 6 Business Process Budget Management Proposal

Procurement of Consumables

Figure 7 shows information about the business process flow of the proposed procurement of Consumables. This process starts with the Laboratory Assistant making a list of Consumable needs requests and submitting confirmations. After being submitted,

the Head of Laboratory Affairs will first check whether the request is by the needs or not. If it is not suitable, then the Laboratory Assistant must revise the request for the item. If appropriate, the Head of Laboratory Affairs will confirm the request, and the Laboratory Staff will check the availability of the submitted Consumables in the laboratory warehouse. If the goods are available, the Laboratory Staff will validate the number of goods from the warehouse according to the proposed needs. If the goods are not available, then the Laboratory Staff will make a purchase order based on the results of checking availability and send it to the Vendor. After the goods arrive, the Laboratory Staff will check the condition and determine the quantity of the goods received. Then validate the number of goods from the warehouse according to the proposed needs and the Laboratory Assistant accepts the request for Consumables and makes an invoice.

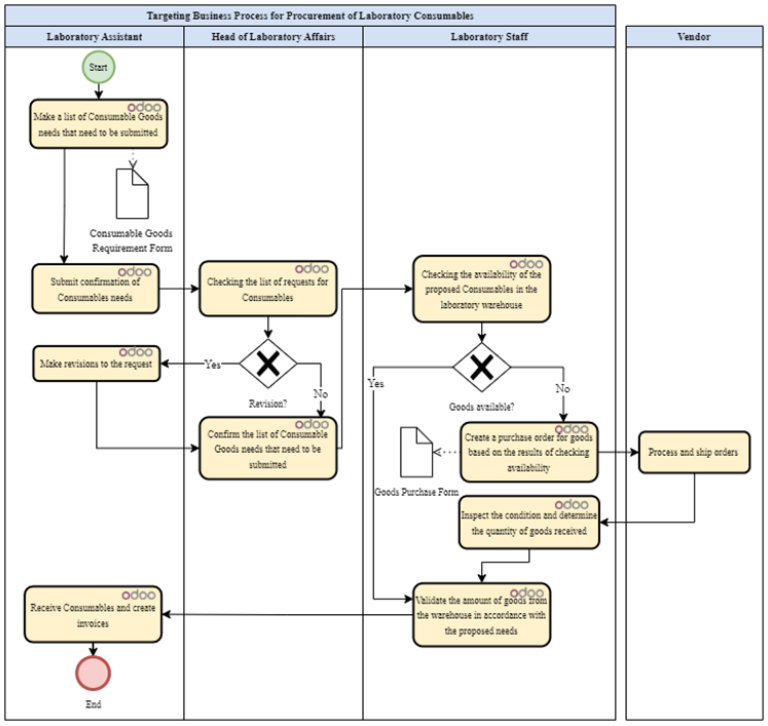

Figure 7 Business Process of Proposed Procurement of Consumables

Accounting Module Configuration

At this stage of the Accounting module configuration, several adjustments will be made to adapt to the business processes and needs of laboratories in educational institutions. This adjustment is done to facilitate the creation of a Budget Work Plan to better monitor the use of the budget.

Creating a Budget Plan

The configuration of making a budget plan can be seen in Figure 8. The first layer on the screen displays some data such as; budget name, person in charge, and budget period. The second layer on the screen has a budget line section that shows the details of the budget plan during the budget period.

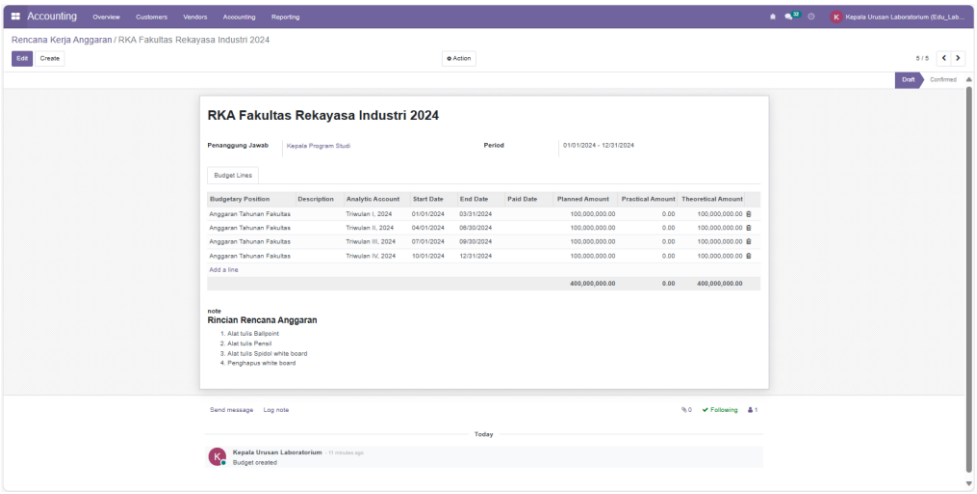

Figure 8 Creating a Budget Plan

In Figure 8, it can be seen that the user has filled in the budget classification which is divided into four quarterly periods in the Budgetary Position column. Each quarter has an Analytic Account with a start and end date that corresponds to the duration of a quarter. The Planned Amount column is populated with the planned budget for each quarter. Meanwhile, the Practical Amount will be automatically updated according to the expenses that occur, and the Theoretical Amount will adjust to the rest of the budget after deducting expenses. For the Note at the bottom of the layer, it was added to detail the budget.

Monitoring Budget Usage

Figure 9 shows how to filter the budget for monitoring. For example, to see your completed budget, click Filters, select Status, then select Done and click Apply. The results display the names of the budgets that have been created, along with the start and end dates according to the budget period, the person in charge, and the status of the budget according to the filtered whether drafted, confirmed, validated, or done.

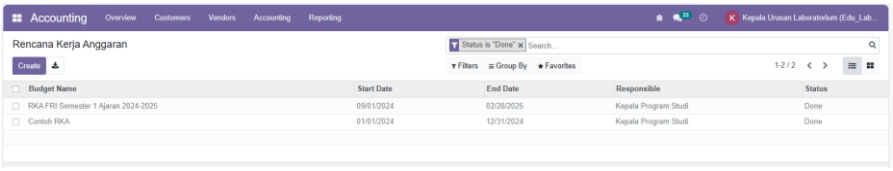

Figure 9 Monitoring Budget Usage

Purchase Module Configuration

In the Purchase module configuration stage, adjustments will be made to ensure that the purchase system in the Odoo application can function according to the needs of laboratories in educational institutions. These adjustments are made to facilitate the creation of a purchase order list and determine the quantity of goods received.

Create a Purchase Order (PO)

The configuration of creating a purchase order can be seen in Figure 10. The first layer on the screen displays some data such as; order number, vendor name, currency, order deadline, and receipt date. While the second layer on the screen contains the order line section.

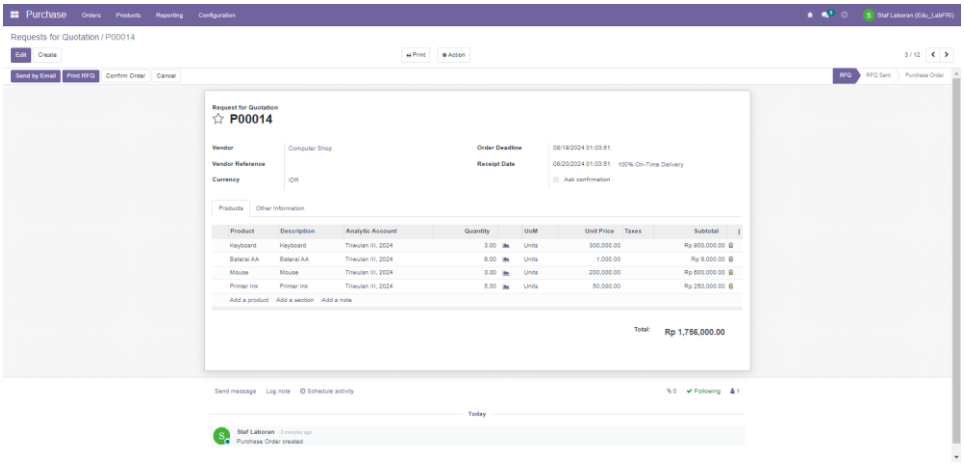

Figure 10 Create a Purchase Order (PO)

In Figure 10, it can be seen that the user has filled in the Product and Description columns with the name and description of the product to be ordered. Users must also fill in an Analytic Account to link the total order with the budget that has been created previously so that the budget is cut. The Quantity column lists the number of items you want to order, and UoM shows the unit of the item. Unit Price contains the unit price of the goods, while the Taxes column lists the amount of tax in percentages. Subtotals are automatically calculated based on the multiplication between Unit Price and Quantity.

Determining the Quantity of Goods Received

The configuration of setting the quantity of goods received can be seen in Figure 11. The first layer on the screen displays several data such as; order number, supplier name, scheduled date for receipt of goods, actual date of receipt of goods, and related document number. While the second layer on the screen contains the order line section.

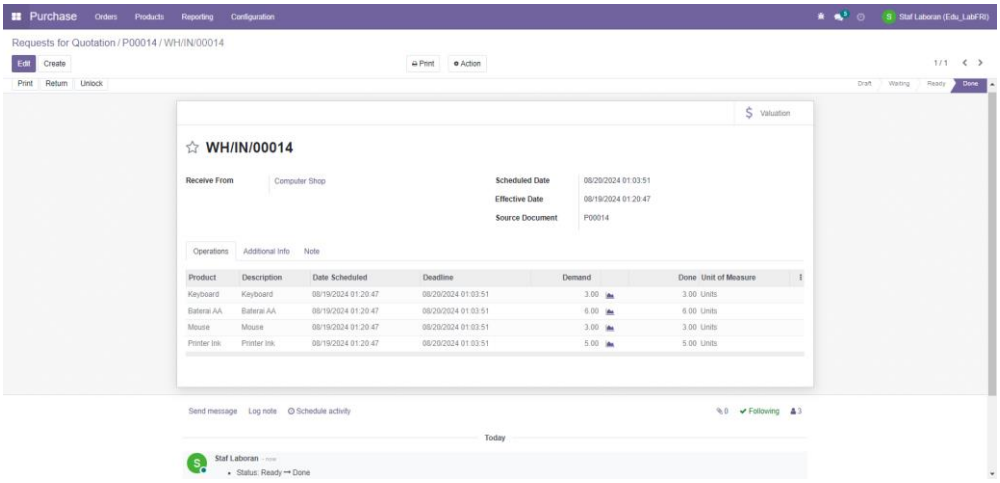

Figure 11 Determining the Quantity of Goods Received

In Figure 11, it can be seen that the orders that have been placed and delivered to the vendor are automatically saved upon receipt of the product. The Product and Description columns include the name and description of the ordered product. Date Scheduled indicates the scheduled date for receipt of goods, while Deadline lists the

deadline for receipt. The Demand column shows the number of goods ordered, Done records the number of goods that have been received, and UoM shows the unit of goods.

Black Box Testing

Black Box Testing is a test method that verifies the results of application execution based on test data input, to ensure that the functionality of the application is by the set requirements (Febrian, et.al, 2020). Black Box Testing is carried out on a budget management system for the procurement of Consumables in Odoo that has been adapted to the laboratory's business processes. Table 5 contains what was tested with the Black Box test and the results show that the test of the system has successfully met all the test objectives with the expected results.

Table 5
Black Box Testing

Process	Description	Testing Objectives	Expected Results	Result
Create a budget plan.	The process of preparing a budget for a specific period	Ensure that users can enter and change budget data, and manage budget periods and associated accounts appropriately.	The budget data entered must be precise and by the specified parameters. The system needs to verify the data to avoid input errors.	Appropriate
Monitor budget usage	The process of monitoring expenditures in a budget period.	Ensure that budget reports are easily accessible to see details of budget usage.	The details of budget usage in the system can be easily accessed and viewed by users.	Appropriate
Create a purchase order (PO)	The process of creating an order to purchase goods	Ensure users can enter purchase data for BHP correctly.	The purchase data entered must be precise and by the specified parameters.	Appropriate
Determining the quantity of goods received	The process of checking and recording the number of goods received in the Warehouse.	Ensure that the system can record the number of items received according to the order.	The system can record the number of items received correctly.	Appropriate

The Accounting & Purchase system testing in this study was conducted using the Black Box Testing method. Based on the tests that have been carried out, no system errors were found, which means that the system has successfully functioned as expected. The success of this system is proven by its ability to store data accurately, according to the input provided by the user. This shows that the system is functioning well and meets user needs.

Expert Judgement

A supervisor acts as an Expert Judgement to make decisions regarding a trainee's progress in practice. (Castanelli, Weller, Molloy, & Bearman, 2020). In this study, the researcher acts as a trainee, namely a student who is supervised by a supervisor. Testing is carried out on the budget management process and procurement of Consumables by testing the Accounting, Purchase, Sales, and Inventory modules that have been adapted to the needs of the laboratory.

Table 6
Expert Judgement

Name	Test Class	Test Item	Output	Estimated	Solution
User 1	Business Process of Budget Management	Technical process for making a budget plan	Good	4	Depending on the policy, it can be changed again.
		The technical process for monitoring budget usage	Good	4	Each role can be detailed and customized so that it can generate reports according to needs.
	Consumables Procurement Business Process	Technical process in creating a purchase order (PO)	Excellent	5	The process of making a purchase order (PO) is by the policy.
		Technical process in determining the quantity of goods received	Excellent	5	The process of determining the quantity of goods received is by the policy.
User 2	Business Process of Budget Management	Technical process for making a budget plan	Good	4	Planned amounts can be made error handling if they are not filled and rules so that they cannot make a budget plan in the same quarter.
		The technical process for monitoring budget usage	Good	4	The process of monitoring the use of the budget is good, if a chart can be added, the representation is better.
	Consumables Procurement Business Process	Technical process in creating a purchase order (PO)	Pretty Good	3	The process of creating a purchase order is quite good, but the purchase can be made without entering an analytic amount which can cause the budget money to go unused.

	Technical process in determining the quantity of goods received	Excellent	5	The process of determining the quantity of goods received from the Vendor is very good and there are no obstacles.

Based on Table 6, the overall Accounting and Purchase system in Expert Judgement has met the needs of laboratories in Educational Institutions in managing the budget for the procurement of Consumables, although there is one process of good value that needs to be improved to be more optimal.

Conclusion

The importance of implementing an Odoo-based Enterprise Resource Planning (ERP) system in budget management and procurement of Consumables in Educational Institutions. Research shows that the use of Spreadsheet to manage budgets and procurement of Consumables is currently inefficient and has many limitations, such as lack of data integration, difficulties in monitoring budgets, and real-time Consumables demand status. By implementing ERP, Educational Institutions can increase transparency and accountability and optimize the process of budget management and procurement of goods. The system developed includes creating a budget plan, monitoring the budget, creating a purchase order, and validating the number of goods received. This shows that this system is effective in meeting the needs of the laboratory, although there is one process that still needs to be improved. It is recommended to add graphs or charts to the accounting dashboard, which will make it easier to visualize the planned use of the budget with its realization. Thus, Odoo's Accounting and Purchase system is expected to overcome existing limitations and increase transparency and accountability in budget management for the procurement of Consumables in Educational Institutions.

Bibliography

Astutik, F., & Muzakkir, M. (2020). Sistem Informasi Manajemen Penelitian Dan Pengabdian Masyarakat Lppm Ikip Mataram Dalam Meningkatkan Motivasi Riset Dosen Internal. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, *5*(1), 69. https://doi.org/10.33394/jtp.v5i1.2855

Castanelli, D. J., Weller, J. M., Molloy, E., & Bearman, M. (2020). Shadow systems in assessment: how supervisors make progress decisions in practice. *Advances in Health Sciences Education*, *25*(1), 131–147. https://doi.org/10.1007/s10459-019-09913-5

Febrian, V., Ramadhan, M. R., Faisal, M., & Saifudin, A. (2020). Pengujian pada Aplikasi Penggajian Pegawai dengan menggunakan Metode Blackbox. *Jurnal Informatika Universitas Pamulang*, *5*(1), 61. https://doi.org/10.32493/informatika.v5i1.4340

Furqorina, R. (2023). Pelatihan dan Pendampingan Pembukuan Keuangan untuk Guru KB/TK Lab UM, Kota Malang. *Jurnal Abdi Masyarakat Indonesia*, *3*(2), 533–538. https://doi.org/10.54082/jamsi.682

Hardianti, T. D., & Guntur, M. (2021). Peran Institiusi Pendidikan Tinggi Terhadap Pemahaman Radikal Di kalngan Mahasiswa (Studi Kasus FT UNM). *Eprints.Unm. Ac.Id*, 1–13. Retrieved from http://eprints.unm.ac.id/19908/

Indriyani, Budiono, A., & Witjaksono, R. W. (2021). Implementasi Enterprise Resource Planning Modul Accounting Menggunakan Aplikasi Odoo Metode Quickstart Pt. Telkom Prima Cipta Certifia. *E-Proceeding of Engineering*, *8*(5), 9266.

Nafianto, C. (2019). Development of Flexible Production Scheduling by Applying Gantt Charts in Manufacturing Module Open Source ERP (Case Study CV. XYZ). *ICSECC 2019 - International Conference on Sustainable Engineering and Creative Computing: New Idea, New Innovation, Proceedings*, (February), 182–185. https://doi.org/10.1109/ICSECC.2019.8907025

Nur Wulandari Dewi Ayu, Anggraeni Sita, & imron. (2020). Buku-Ajar-ERP-ERP-soft-copy. *Enterprise Resource Planning (ERP)*.

Rahmi, W. D. (2021). Perancangan Enterprise Resource Planning, Untuk Sistem Payroll Menggunakan Software Odoo Dengan Metode Quick Start Pada Lembaga Sertifikasi Pt Telkom Prima Cipta Certifia. *EProceedings of Engineering*, *8*(5), 9617–9623. Retrieved from https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/15783/15496%0Ahttps://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/15783

Ramadhani, S. P. (2020). *PENGELOLAAN LABORATORIUM, Panduan Para Pengajar dan Inovator Pendidikan.* (Yiesa Media Karya, Ed.). Depok: Yiesa Media Karya.

Riyadi, A. (2019). Desain Pengembangan Laboratorium Dakwah: Studi Kasus UIN Walisongo Semarang. *Jurnal Komunikasi Islam*, *9*(1), 129–153.

Siagian, L. J. (2019). Otomatisasi Pengujian Perangkat Lunak Software Testing Automation, 172.

Stander, H. M., Cohen, B., Harrison, S. T. L., & Broadhurst, J. L. (2023). Validity of using expert judgments to inform multiple criteria decision analysis: Selecting technologies for sulfide-enriched fine coal waste reuse. *Journal of Cleaner Production*, *415*(November 2022), 137671. https://doi.org/10.1016/j.jclepro.2023.137671

Suminten. (2019). Implementasi Enterprise Resource Planning (ERP) Pada Usaha Pithik Sambel Ndesso Berbasis Odoo. *Jurnal PROSISKO*, *6*(1), 60–68. Retrieved from https://e-jurnal.lppmunsera.org/index.php/PROSISKO/article/view/1127

Taluke, D., Lakat, R. S. M., Sembel, A., Mangrove, E., & Bahwa, M. (2019). Analisis Preferensi Masyarakat Dalam Pengelolaan Ekosistem Mangrove Di Pesisir Pantai Kecamatan Loloda Kabupaten Halmahera Barat. *Spasial*, *6*(2), 531–540.

Trengginaz, R. B., & Yusup, A. (2020). Pengujian Aplikasi Pemesanan Tiket Kereta berbasis Website Menggunakan Metode Black Box dengan Teknik Equivalence Partitioning. *Jurnal Teknologi Sistem Informasi Dan Aplikasi*, *3*(3), 144. https://doi.org/10.32493/jtsi.v3i3.5349

Astutik, F., & Muzakkir, M. (2020). Sistem Informasi Manajemen Penelitian Dan Pengabdian Masyarakat Lppm Ikip Mataram Dalam Meningkatkan Motivasi Riset Dosen Internal. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, *5*(1), 69. https://doi.org/10.33394/jtp.v5i1.2855

Castanelli, D. J., Weller, J. M., Molloy, E., & Bearman, M. (2020). Shadow systems in assessment: how supervisors make progress decisions in practice. *Advances in Health Sciences Education*, *25*(1), 131–147. https://doi.org/10.1007/s10459-019-09913-5

Febrian, V., Ramadhan, M. R., Faisal, M., & Saifudin, A. (2020). Pengujian pada Aplikasi Penggajian Pegawai dengan menggunakan Metode Blackbox. *Jurnal Informatika Universitas Pamulang*, *5*(1), 61. https://doi.org/10.32493/informatika.v5i1.4340

Furqorina, R. (2023). Pelatihan dan Pendampingan Pembukuan Keuangan untuk Guru KB/TK Lab UM, Kota Malang. *Jurnal Abdi Masyarakat Indonesia*, *3*(2), 533–538. https://doi.org/10.54082/jamsi.682

Hardianti, T. D., & Guntur, M. (2021). Peran Institiusi Pendidikan Tinggi Terhadap Pemahaman Radikal Di kalngan Mahasiswa (Studi Kasus FT UNM). *Eprints.Unm. Ac.Id*, 1–13. Retrieved from http://eprints.unm.ac.id/19908/

Indriyani, Budiono, A., & Witjaksono, R. W. (2021). Implementasi Enterprise Resource

Planning Modul Accounting Menggunakan Aplikasi Odoo Metode Quickstart Pt. Telkom Prima Cipta Certifia. *E-Proceeding of Engineering*, *8*(5), 9266.

Nafianto, C. (2019). Development of Flexible Production Scheduling by Applying Gantt Charts in Manufacturing Module Open Source ERP (Case Study CV. XYZ). *ICSECC 2019 - International Conference on Sustainable Engineering and Creative Computing: New Idea, New Innovation, Proceedings*, (February), 182–185. https://doi.org/10.1109/ICSECC.2019.8907025

Nur Wulandari Dewi Ayu, Anggraeni Sita, & imron. (2020). Buku-Ajar-ERP-ERP-soft-copy. *Enterprise Resource Planning (ERP)*.

Rahmi, W. D. (2021). Perancangan Enterprise Resource Planning, Untuk Sistem Payroll Menggunakan Software Odoo Dengan Metode Quick Start Pada Lembaga Sertifikasi Pt Telkom Prima Cipta Certifia. *EProceedings of Engineering*, *8*(5), 9617–9623. Retrieved from https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/15783/15496%0Ahttps://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/15783

Ramadhani, S. P. (2020). *PENGELOLAAN LABORATORIUM, Panduan Para Pengajar dan Inovator Pendidikan.* (Yiesa Media Karya, Ed.). Depok: Yiesa Media Karya.

Riyadi, A. (2019). Desain Pengembangan Laboratorium Dakwah: Studi Kasus UIN Walisongo Semarang. *Jurnal Komunikasi Islam*, *9*(1), 129–153.

Siagian, L. J. (2019). Otomatisasi Pengujian Perangkat Lunak Software Testing Automation, 172.

Stander, H. M., Cohen, B., Harrison, S. T. L., & Broadhurst, J. L. (2023). Validity of using expert judgments to inform multiple criteria decision analysis: Selecting technologies for sulfide-enriched fine coal waste reuse. *Journal of Cleaner Production*, *415*(November 2022), 137671. https://doi.org/10.1016/j.jclepro.2023.137671

Suminten. (2019). Implementasi Enterprise Resource Planning (ERP) Pada Usaha Pithik Sambel Ndesso Berbasis Odoo. *Jurnal PROSISKO*, *6*(1), 60–68. Retrieved from https://e-jurnal.lppmunsera.org/index.php/PROSISKO/article/view/1127

Taluke, D., Lakat, R. S. M., Sembel, A., Mangrove, E., & Bahwa, M. (2019). Analisis Preferensi Masyarakat Dalam Pengelolaan Ekosistem Mangrove Di Pesisir Pantai Kecamatan Loloda Kabupaten Halmahera Barat. *Spasial*, *6*(2), 531–540.

Trengginaz, R. B., & Yusup, A. (2020). Pengujian Aplikasi Pemesanan Tiket Kereta berbasis Website Menggunakan Metode Black Box dengan Teknik Equivalence Partitioning. *Jurnal Teknologi Sistem Informasi Dan Aplikasi*, *3*(3), 144. https://doi.org/10.32493/jtsi.v3i3.5349