



## The Impact of Warehouse Management System (WMS) Implementation on Student Stock Control Competence in Practical Learning

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### Abstract

*This study aims to evaluate the optimization of practical learning in Warehouse Management courses through the implementation of Warehouse Management System (WMS) to improve student satisfaction in stock control competencies. The development of information technology demands adaptation in the educational process, especially in the highly dynamic supply chain field, one of which is competency in stock control. Conventional learning methods are often less effective in providing comprehensive practical experience related to real-time inventory management. This study examines the significant influence between before using a warehouse management system and after using a warehouse management system on the performance of the practicum warehouse in stock control. This study uses a quantitative approach with a sampling technique that is a saturated sample technique that takes all samples from all students of the Logistics Engineering Technology study program. The analysis technique used is multiple linear regression using SPSS software. The results of the study show that the variable before using WMS on the performance of the practicum warehouse on student satisfaction in stock control competencies is 0.002 <0.05 and the calculated T value is 3.492 meaning that H1 is accepted and has a statistically significant influence on the dependent variable. While the research after using WMS on the performance of the practicum warehouse performance on student satisfaction in stock control competency is 0.008 <0.05 and the calculated T value is 2.879 meaning that H2 is accepted and has a statistically significant influence on the Warehouse performance variable. Therefore, it can be concluded that before or after the use of WMS has an effect on warehouse performance which can increase student satisfaction and stock control competency in the Logistics Engineering Technology study program at Jambi Polytechnic.*

**Key words:** Warehouse Management System (WMS), Practical Learning, Warehouse Management, Stock Control Competency, Student Satisfaction.

### 1. Introduction

The dynamics and rapid developments in the supply chain require significant adaptations in the educational process, particularly to produce competent graduates in this modern era. One



crucial area requiring special attention is stock control within the inventory system, which is the backbone of warehouse operational efficiency. Inventory is the sum of raw materials, semi-finished products, and finished products stored by a company to support its business operations [1]. The primary objective of inventory management is to ensure sufficient stock availability without causing excess or shortages, which could impact operational costs [2].

This increasingly complex and dynamic industrial environment demands that educational institutions adapt, particularly in preparing graduates ready to face the challenges of the workplace. However, conventional learning methods often face challenges in providing comprehensive practical experience, particularly regarding real-time inventory management in warehouse management courses. This gap can hinder students' understanding of the complexities and true challenges of warehouse management. As noted by [3] stated that warehousing activities must have a good storage system to support the smooth production process and other warehousing activities related to the science of regulating the storage and release of goods in the warehouse [4].

Along with advances in information technology, the implementation of systems such as the Warehouse Management System (WMS) has changed the paradigm of warehouse management. It is a computer application system [5] used in managing the process of handling goods from receipt to delivery [6]. The implementation of a WMS can also increase the effectiveness and efficiency of warehousing processes [7], [8].

In the learning process, students in the warehouse management practice course in the Logistics Engineering Technology study program at Jambi Polytechnic have not been optimal in their implementation. Therefore, a proposal was proposed for the development of a WMS for implementation in the learning process. This study aims to evaluate the optimization of practical learning in the Warehouse Management course through the implementation of WMS with a focus on increasing student satisfaction with stock control competencies. The study quantitatively tests the significant influence between conditions before and after the use of WMS on the performance of the practical warehouse that can improve student satisfaction and competency in stock control which is expected to provide insight into the effectiveness of WMS.



## 2. Method

This study uses a quantitative approach to examine the relationship between the dependent variable (before and after using a WMS) and the independent variable (the warehouse performance of the practical work) on student satisfaction with stock control competency. The testing process used SPSS. Data are considered valid if the Sig. (2-tailed) value is  $<0.05$ , indicating that the instrument or question item significantly correlates with the total score and is therefore valid. Furthermore, data are considered reliable if the Cronbach's Alpha value is  $>0.60$  [9].

Furthermore, this study also provides a solution by creating a warehouse management system designed to support the practice of warehouse management courses in the Logistics Engineering Technology study program in stock control. A Warehouse Management System is an information technology-based tool or method used to improve warehouse efficiency by coordinating warehouse activities and maintaining accurate inventory by recording warehouse transactions and through database data collection. Proper and effective use of a Warehouse Management System can significantly improve warehouse efficiency and productivity [10].

## 3. Result and Discussion

Based on this research, here is the result and discussion:

### 3.1. Warehouse Management System (WMS) Application Processing

#### a. Dashboard Page

This dashboard page includes menus in this system, such as types of goods for inputting new goods or master goods, incoming goods data, outgoing goods data, goods inventory data, and customer data.

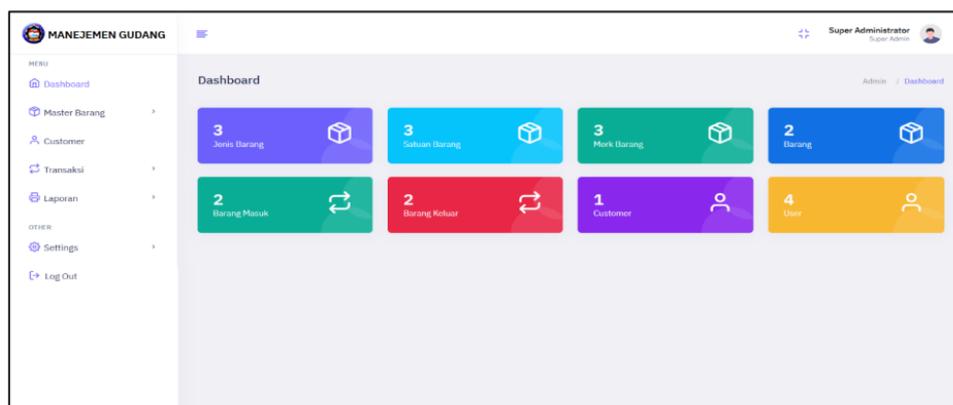


Figure 1. Dashboard Page



b. Display of Master Data for Goods

In the item master data menu, the admin is required to input item information such as item image, item code, item name, item type, item unit, item brand, number of items in stock if any, and item price.

NO	GAMBAR	KODE BARANG	NAMA BARANG	JENIS	SATUAN	MERK	STOK AWAL	HARGA	ACTION
1		BRG-1669390220236	Baut 24mm	Besi	Kg	Steel	0	Rp 1,000,000	
2		BRG-1669390175622	Motherboard	Perangkat Komputer	Qty	Lenovo	0	Rp 4,000,000	

Figure 2. Master Data Display for Goods

c. Customer Data Display

In the customer data menu, the thing that the admin needs to pay attention to is filling in the customer's PT/Personal name, cellphone number, and customer address.

NO	CUSTOMER	NO TELP	ALAMAT	ACTION
1	Ani	088899776656	Jakarta	
2	Joko	087817379229	Jambi	

Figure 3. Customer Data Display



d. Display of Transaction Data for Incoming Goods Menu

In the incoming goods transaction menu, the admin must fill in the date the goods were received, the incoming goods code number, goods code, customer, goods, and the number of incoming goods.

NO	TANGGAL MASUK	KODE BARANG MASUK	KODE BARANG	CUSTOMER	BARANG	JUMLAH MASUK	ACTION
1	30 November 2022	BM-1669731639801	BRG-1669390175622	Arnold Ganteng	Motherboard	10	[Edit] [Delete]
2	01 November 2022	BM-1669730554623	BRG-1669390220236	Marhaini	Baut 24mm	50	[Edit] [Delete]

Figure 4. Transaction Data Display for the Incoming Goods Menu

e. Stock Report

In the stock report, there are several reports from which we can obtain data, namely item code, item name, initial stock, number of incoming goods, number of outgoing goods, and total stock in inventory as in the following system.

NO	KODE BARANG	BARANG	STOK AWAL	JUMLAH MASUK	JUMLAH KELUAR	TOTAL STOK
1	BRG-1669390220236	Baut 24mm	0	50	20	30
2	BRG-1669390175622	Motherboard	0	10	5	5

Figure 5. Stock Report

### 3.2. Validity and Reliability Test



The analysis conducted in this study involved calculating validity and reliability tests using SPSS. Based on the data obtained, the results of the SPSS calculations can be seen in Table 1.

Table 1. Validity and Reliability Test

Before Using WMS (X1)		R-Count	Cronbach's Alpha
PRE 1	Before using a WMS, the process of recording and tracking inventory in the lab warehouse was often time-consuming and prone to errors.	0.006	0.753
PRE 2	Accurate, real-time inventory information was difficult to access before the WMS.	0.000	
PRE 3	Storage locations in the lab warehouse were often unsystematic, making retrieval difficult.	0.001	
PRE 4	Overstocking and understocking of lab items frequently occurred due to the lack of an effective inventory management system.	0.005	
PRE 5	Students often had difficulty finding needed lab items due to the disorganized warehouse layout.	0.019	
PRE 6	Overall, lab warehouse operations were difficult to organize and analyze because data was not properly recorded.	0.000	
After Using WMS (X2)		R-Hitung	Cronbach's Alpha
POST 1	After using a WMS, the process of recording and tracking stock in the laboratory warehouse has become faster and more accurate.	0.000	0.794
POST 2	Accurate, real-time stock information is now easily accessible in the laboratory warehouse thanks to the WMS.	0.001	
POST 3	Determining the storage location of goods in the laboratory warehouse is now more	0.006	



	systematic and facilitates retrieval after the WMS implementation.		
POST 4	The WMS helps reduce overstock and understock of laboratory items, thus optimizing stock availability.	0.000	
POST 5	The time spent on physical inventory of the laboratory warehouse has become significantly shorter and more efficient after using the WMS.	0.000	
POST 6	Overall, laboratory warehouse operations have become more organized and efficient thanks to the use of the WMS.	0.033	
Practical warehouse performance on student satisfaction in stock control competency (Y)		R-Count	<i>Cronbach's Alpha</i>
KGP 1	The high accuracy of stock data in the lab warehouse (after WMS) helped me understand the importance of accurate data in stock control.	0.000	0.809
KGP 2	The ease of access to real-time stock information in the lab warehouse (after WMS) improved my understanding of inventory dynamics.	0.000	
KGP 3	The efficiency of the picking and putaway process in the lab warehouse (after WMS) helped me understand optimal warehouse workflows.	0.003	
KGP 4	The use of WMS in the lab warehouse made me feel more confident in identifying and resolving stock control issues.	0.000	
KGP 5	The presence of WMS in the lab warehouse provided a learning experience that was more relevant to current industry conditions in warehouse management.	0.000	
KGP 6	Overall, the lab experience in the warehouse with WMS increased my satisfaction with	0.000	



	the competencies I gained in stock control.		
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Based on the data in table 1, all question items (indicators) for the three variables (X1, X2, and Y) are declared valid because each value is below 0.05. This means that each question is able to measure the intended concept accurately. Furthermore, for the reliability data, all instruments (each question per variable) for the three variables (X1, X2, and Y) are declared reliable because all Cronbach's alpha values are known to be more than 0.6. This indicates that the instrument is consistent and stable in its measurements.

### 3.3. Multiple Linear Regression Analysis

In the next step is multiple linear regression test as follows.

Table 2. Multiple linear regression test coefficients

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	4.589	4.621		.993	.329
	Before Using WMS	.499	.143	.489	3.492	.002
	After Using WMS	.316	.110	.403	2.879	.008

a. Dependent Variable: Practical warehouse performance on student satisfaction in stock control competency

Overall, the results of this multiple linear regression analysis indicate that both conditions, both Before Using WMS (X1) and After Using WMS (X2), have a positive and significant influence on the dependent variable, namely the performance of the practicum warehouse on student satisfaction in stock control competency (Y). This means that changes in the conditions or experiences represented by these two variables are statistically related to the increase in the process of practicum warehouse performance on student satisfaction in stock control competency improvement. This increase in conditions increases efficiency in optimizing the management of the practicum warehouse and quality in the learning process.



### 3.4. Simultaneous Test (F)

In the next step, a simultaneous test was carried out using SPSS to see the significant simultaneous influence of all independent variables on the dependent variable as follows.

Table 3. Simultaneous Test (F)

ANOVA <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	182.775	2	91.388	14.593	.000 <sup>b</sup>
Residual	169.091	27	6.263		
Total	351.867	29			
a. Dependent Variable: Y					
b. Predictors: (Constant), X2, X1					

Based on the Sig. value (.000), Thus, we can conclude that the independent variables before (X1) and after using WMS (X2) together (simultaneously) have a significant influence on the dependent variable of the performance of the practical warehouse on student satisfaction in stock control competency (Y).

### 3.5. Test of the Coefficient of Determination

Finally, a coefficient test (R<sup>2</sup>) is carried out, which essentially measures the extent to which the model is able to explain variations in the dependent variable, as in the following table.

Table 4. Determination Coefficient Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721 <sup>a</sup>	.519	.484	2.503
a. Predictors: (Constant), X2, X1				

Based on this data, it can be concluded that the variables before using WMS (X1) and after using WMS (X2) have a fairly good ability to explain variations in the warehouse performance variable of the practicum on student satisfaction in stock control



competency (Y). With almost half (51.9% or 48.4% after adjustment) of the variation in Y that can be explained by the model, this indicates that the regression model of this study has a fairly strong predictive power. Meanwhile, the remaining variation in Y is explained by other factors outside the variables X1 and X2.

#### 4. Conclusion

Based on the application of warehouse management system and data analysis using multiple linear regression with hypothesis testing using T test and F test, this study can be concluded that the variables before using WMS and after using WMS both have a direct and significant influence on the performance of the practicum warehouse on student satisfaction in stock control competency. These results indicate that in the warehouse management practicum process, attention must be paid to the benefits obtained by students in using the warehouse management system and improving the quality of learning. This also has an impact on increasing student satisfaction and stock control competency in the Logistics Engineering Technology study program at Jambi Polytechnic.

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