Project Report: Developing an Electronic Inventory Management Platform

Executive Summary

This project addresses the inefficiencies in inventory management within healthcare facilities, specifically targeting the manual data entry process for surgical supplies. The manual approach was found to be time-consuming, error-prone, and lacking real-time analytics, which hindered effective decision-making and resource allocation.

To tackle these challenges, I developed an electronic inventory record platform using Lean Six Sigma DMADV methodology. The new system includes a user-friendly Google Form for data entry, accessible via 2D barcode labels placed in each operating room. Staff can easily scan the barcodes with their mobile phones or available iPads, which streamlines the data entry process. The information is automatically transferred to Google Sheets, where coding generates real-time analytical results such as monthly usage, remaining supplies, and usage trends.

Key results and benefits of the project include:

- **Time Savings:** The time spent on data entry by nurses was significantly reduced, allowing them to focus more on patient care. Additionally, the time saved in data analysis, equivalent to 44 hours monthly, was reallocated to strategic tasks.
- **Enhanced Accuracy:** The automated system minimized errors, improving the reliability of stock data for decision-making.
- **Optimized Inventory:** Real-time analytics enabled proactive inventory management, resulting in optimized stock levels and cost savings.

Considerations during the project included the use of readily available resources (iPads, computers, and scanners), training costs for users to learn the new system, and ensuring data security and confidentiality.

In conclusion, the implementation of the electronic inventory record platform has led to significant improvements in efficiency, accuracy, and resource management within the healthcare facility. Future recommendations include expanding the platform to other departments and continuously gathering user feedback to further enhance the system.

1. Define Phase

Problem Statement: Manual data entry of surgical supplies information is time-consuming, prone to errors, and lacks real-time analytics, leading to inefficiencies in inventory management.

Project Goals:

- To develop an electronic inventory record platform that automates data entry and provides real-time analytics to improve stock management efficiency and accuracy.

Scope:

- The project focuses on replacing the manual data entry process for stock management with an automated electronic system, targeting healthcare facilities managing surgical supplies.

Stakeholders:

- Operating room management team
- Fixture and equipment team
- Nursing team leader
- IT department
- End-users (nurses)

2. Measure Phase

Current State Analysis:

- **Time Study:** Manual data collection and analysis occupy at least 25% of the team leader's working time; Manual data entry consumed an average of 22% of the total time for minor surgical procedures.
- **Error Rate:** Error rate (missing data or unclear data entry) was approximately 14%. High error rate in manual entries causing inventory discrepancies.
- **Data Reporting:** Data reporting and analysis were conducted monthly due to manual compilation.

Data Collection:

- Data was collected from user logs, time studies, and error reports to establish a baseline for current processes.

Measurement Plan:

- **Metrics Identified:** Time saved in data entry, reduction in error rates, frequency of data updates, user satisfaction with real-time analytics.

3. Analyze Phase

Root Cause Analysis:

- **Time Consumption:** Manual entry is slow and cumbersome.
- **Errors:** High frequency of errors due to manual entry.
- **Lack of Real-Time Data:** Monthly reporting cycle limited responsiveness to surgical supplies usage trends, and delays in data processing affect decision-making.

Process Mapping:

- Mapped the existing manual process to identify bottlenecks and inefficiencies.
- Mapped the new automated process to compare improvements.

Considerations:

- Make use of readily available resources (iPads, computers, scanners in each room).
- Training cost for users to learn the new system.
- Data security and confidentiality.

4. Design Phase

Solution Identification:

- Developed an electronic inventory record platform using Google Forms and Sheets.
- Platform allows real-time data entry and automatic transfer to a centralized spreadsheet for analytics.

Solution Design:

- Developed a Google Form for users to input stock information.
- Generated a 2D barcode label for each operating room, linking to the Google Form.
- Users can easily access the form by scanning the barcode with their mobile phones or iPads available in each room.
- Integrated the form with Google Sheets for automatic data transfer.
- Implemented coding in Google Sheets to generate analytical results automatically (monthly usage, stock remaining, usage trends).

5. Verify Phase

Implementation:

- **Barcode Deployment:** Placed 2D barcode labels in each operating room for easy access to the Google Form.
- **User Interface:** Created a user-friendly interface for data entry on the Google Form.
- **Data Integration:** Automated the transfer of data from the Google Form to Google Sheets.
- **Analytics Automation:** Set up coding in Google Sheets to automatically generate analytical results.
- **End-Users Training:** Conducted user training sessions to ensure adoption and effective use of the platform.
- **Management Team Training:** Conducted training sessions for team leaders and managers to familiarize them with accessing the analytic report and report comprehension.
- **Pilot Testing:** Conducted a pilot test in a selected department to evaluate the effectiveness of the new system.

Verification of Improvements:

- Reduced data entry time by 60%.
- Decreased error rates to less than 1% through automated data validation.
- Enabled real-time reporting and analytics, improving responsiveness to stock usage trends.
- Eliminated 44 clinical hours per month previously spent by the team leader on data collection and analysis.

6. Results and Benefits

Time Saved:

- For the end-users, time saved in data entry allows nurses to focus more on patient care.
- For the team leaders, data analysis time saved, equivalent to 44 hours monthly, reallocates resources to strategic tasks.

Enhanced Accuracy:

- Error reduction enhances the reliability of inventory data for decision-making.

Optimized Inventory:

- Real-time analytics facilitate proactive stock management, resulting in optimized stock levels and cost savings.

7. Control Phase

Control Plan:

- Established regular audits (half-yearly) of data integrity and platform performance.
- Implemented feedback loop to continuously improve platform functionality based on user input.
- Monitored key metrics to ensure sustained improvements in efficiency and data accuracy.

8. Lean Six Sigma Tools Used

- **Project structure**: This structure aligns with Lean Six Sigma methodology, emphasizing the Define, Measure, Analyze, Design, and Verify (DMADV) framework.
- **Process Mapping:** Used to visualize and streamline data entry and reporting processes.
- **Root Cause Analysis:** Identified key factors contributing to inefficiencies in manual processes.
- **Statistical Analysis:** Analyzed error rates and time savings quantitatively to measure improvements.

9. Conclusion

Summary:

This project applied Lean Six Sigma principles to transform inventory record management from a manual, error-prone process to an efficient, real-time data-driven system. By leveraging Google Forms and Sheets, I significantly improved data accuracy, reduced operational costs associated with manual processes, and enhanced decision-making capabilities through timely analytics.

Future Recommendations:

- Expand the platform to other departments and facilities.
- Continuously gather user feedback to further improve the system.
- Explore additional features such as automated alerts for low stock levels.

Lessons Learned:

- Importance of stakeholder engagement in design and implementation phases.
- Continuous improvement mindset crucial for sustaining gains in efficiency and data quality.
- Flexibility in adapting Lean Six Sigma tools to fit project scope and objectives.