Famor, Joshua Martin
Nodado, Alfred
Sato, Hanna

Online Activity No. 8 and 9:   Applying the User-Centred System Design Process

Objective

1. Innovate an existing interactive system and computer technology.
2. Perform and apply UCSD.

Materials

- Personal computer
- Any software for (Computer aided designs)or programming language

Background

Atakan(2006), UCSD is used in the design process. Reasons are evaluated why traditional-technology-focused design processes why it may result in unusable systems-and the consequences of those unusable or useless systems. This leads directly to a consideration of the different methodologies that go to make up a user-centered system design process.

Procedure

a.) Identify a scope or agenda
b.) Format for the document is given below as guide for the designers in the making the output both the document and design.

Chapter I. Introduction

Background of the study

Tom N Toms, a prominent café chain in Korea, currently manages its inventory using a traditional and largely manual system. This outdated approach results in various operational inefficiencies, including inaccurate stock levels, delayed restocking, resource waste, and overstocking. These issues significantly hinder the company's ability to optimize inventory usage, minimize waste, and maintain consistent product availability across its locations.

Recognizing this pressing need, the proponents propose the development of an automated, streamlined inventory management solution. By integrating modern technologies, this system aims to enhance operational efficiency, improve inventory accuracy, and support scalable growth throughout the entire café network.

Statement of the problem

Manual Inventory Process

Tom N Toms currently employs a manual inventory system that requires staff to physically count stock items regularly. This process is time-consuming, typically requiring 3-4 hours per week of dedicated staff time, and is prone to human error with an average discrepancy rate of 8-12% between actual stock and recorded inventory. The manual nature of this process creates delays in inventory updates, leading to situations where management lacks real-time visibility of current stock levels.

Disconnected POS and Inventory System

implemented a Point of Sale (POS) system to handle transactions, it operates independently from inventory management. This disconnection creates a significant information gap where sales data does not automatically update inventory levels. Staff must manually reconcile sales reports with inventory counts, a process that takes approximately 5-7 hours per week and introduces another layer of potential errors.

Inefficient Reporting and Analysis Capabilities

The current system lacks comprehensive reporting tools that would enable management to analyze inventory turnover rates, identify slow-moving items, or forecast future inventory needs based on sales patterns. Management currently spends an estimated 8-10 hours per month compiling and analyzing inventory and sales data from disparate sources.

Assumption of the study

This proposed system will address the mentioned problem statements and will have the following features:

- Automated Integration with POS: You'll build an automated inventory control system integrated with your current POS infrastructure that allows the inventory to be updated in real-time, with no manual record-keeping requirements.

- Forecast Demand using ML: You will employ machine learning algorithms that will use historical sales and seasonal demand patterns as well as externalities to forecast demand.

- Optimize Stock Requirements: You will create predictive models to forecast stock commitments that will support order fulfilment while optimizing stock levels to mitigate overstocking and stock-outs.

- Develop Adaptive Learning System: You will create a system which supports continuous learning, and over time, the system will become better at predicting demand, even with changing market conditions.

- Management Dashboard: You will create a dashboard to display advanced data trends in a simple manner, in a way that supports management decision making.

- Measure system performance: You will measure and evaluate the impact of your system on inventory costs, waste savings, order fulfilment rate, operational efficiency, etc.

- Scaling: You will develop recommendations to optimize the system and opportunities for scaling through the Tom N Toms franchise network.

Significance of the study

This research is intended to help multiple players in Tom N Toms Coffee's operations. The proposed Inventory Management System can help simplify the process of monitored inventory, provide accuracy of stock, and ideally allow for efficient restocking and pull-out procedures. There are several beneficiaries identified in the methodology, listed below from the most senior to the least senior in the organizational chart:

1. Franchise Owner / General Manager: As a franchise owner or general manager, the operational efficiency and accuracy of the system will provide real-time access to inventory reports and logs that will aid the operational manager in making decisions related to costs, restocking, and forecasting.

2. Operations Manager: The operations manager would use the system to keep track of daily inventory levels, make sure that inventory procedures are standardized between branches, minimize errors that are usually caused by manual entry, and help assists decision making in relation to supply chain and resource allocation.

3. Inventory Supervisor / Store Supervisor: The inventory supervisor/store supervisor can now keep track of inbound and outbound items, be notified for low-stock alerts, and create works order to track the movement of inventory as it is used. This will reduce the chance of stock outs and/or overstocking, and increase day-to-day control of inventory movement in the store.

4. Purchasing Officer: The purchase order process can be simplified since the purchasing officer can see what is in stock and how much historical usage there has been in order to provide better quality of order for the suppliers, with more precision and accuracy, while minimizing wasted stock due to over-ordering.

5. Baristas: Baristas and kitchen staff will be able to rely on an uninterrupted supply of ingredients and utensils for tasks, which maximizes quality service and customer satisfaction.

Chapter II. Research Design

A. Task Analysis

A Hierarchical Task Analysis (HTA) was created to further comprehend the workflow and responsibilities of inventory workers. This analysis served to decompose the overall processes involved in using the system into smaller overall and task level processes.
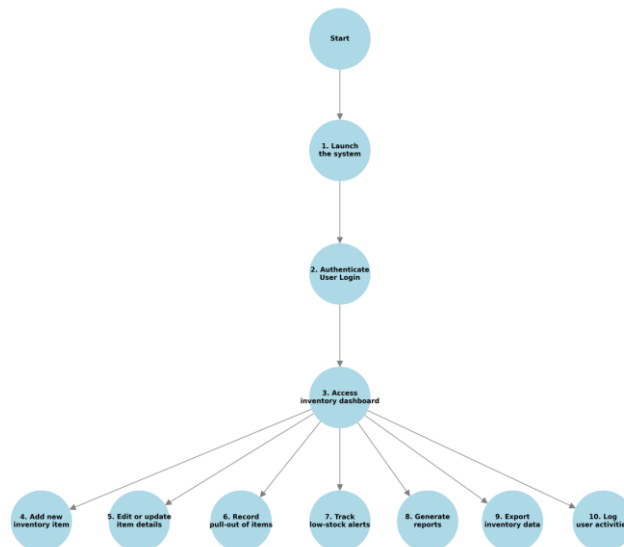
1. Launch the system: Open the inventory application on a computer in order to commence business.
2. Authenticate User Login: Enter valid user credentials (username and password) to log into the system with the appropriate permissions based on your role.
3. Access inventory dashboard: View inventory overview including total items, low stock notice, and any recent activities.
4. Add new inventory item: Provide required information to enter a new inventory item into the system, including item name, category, unit, quantity, and supplier information.
5. Edit or update existing item details: Edit any information for an existing item: change quantity or supplier, adjust expiration dates.
6. Record pull-out of items: Record items that are pulled out of inventory (used), including the quantity and reason/purpose for pulling them out.
7. Track low-stock alerts: Automatically notify users if an item's quantity goes below minimum threshold level and recommend reordering stock.
8. Generate reports (daily/weekly/monthly): Generate reports that summarize current stock activities, including stock movements and quantities for the given period.
9. Export inventory data: Allow users to export and download inventory tables or reports in various export options (CSV or PDF) for backup or external review process.

10. Log user activities: Record every important action performed by users in the table (for example - add, update, delete) for accountability.

B. Requirements Gathering

To ensure that the system is well-aligned with real needs, the group conducted **multiple data collection methods**, each tailored to gather both qualitative and quantitative insights:

Interview

The group conducted informal interviews with individuals in the stores: people who handle inventory and supervisors. The questions revolved around previous challenges related to managing stock, tools used (manual logs, Excel sheets), as well as required components. Interviewees emphasized what they require: accurate dates/updates, finding also, better tracking, expiration date tracking, an alert for low stock.

Survey/Questionnaire

To validate and augment the interview data, I sent a brief survey to a large number of other staff members. The responses show that most users wished for a simpler, more user-friendly interface, and preferred to run from a local desktop system than to have to rely on the cloud tools because of internet restrictions or limitations during busy hours**.**

Observation

The team also completed short observations of actual inventory events taking place at the store. The group was able to gain insight into performance pain points like duplicated entries, missing stock records, and slow update cycles that are involved in using manual logs. These observations were a primary source of data that was used to inform the design of efficient data input and inventory tracking modules.

Identified Requirements

- **User Requirements:** Users require easy-to-use, easy-to-learn systems for rapid access to inventory data. The system will need to include role-based access, point of sale (item lookup), visual representations of low stock/all expired items, etc.
- **Functional Requirements:** The system must support adding/editing inventory, tracking pull-outs, generating logs, exporting reports, and viewing summary dashboards. User login/logout and access control features are also essential**.**
- **Data Requirements:** The key fields for data include Item Code, Item Name, Category, Unit, Quantity, Expiration Date, Restock Date, Supplier Info, Activity Logs, etc. All records must be stored safely and securely**.**
- **Environmental Requirements:** The product should be installable on Windows-based machines. It should be usable with little to no internet connectivity. Some level of data storage locally would be preferred (e.g. SQLite or MySQL).

- **Usability Requirements:** The interface must include fairly large fonts for easy readability, buttons must be located in logical places, and it must be easy to navigate. Users should be able to complete core job functions in three clicks at the most.
- **Designer's Requirements:** The design will be focused on simplicity and clarity. Each form (item entry, pull-out, view logs) must be logically organized, contain the same formatting for each item, whenever possible should have dropdowns and calendars for date selection. The overall layout will be flexible enough to allow for future enhancements such as supplier portals or automated ordering.

C. Storyboarding and Prototyping

This storyboard shows the struggle of the baristas at tom n toms and why there is a must for this system.

Login Page

This part is where the users can log in, they can either choose between a cashier or a manager.
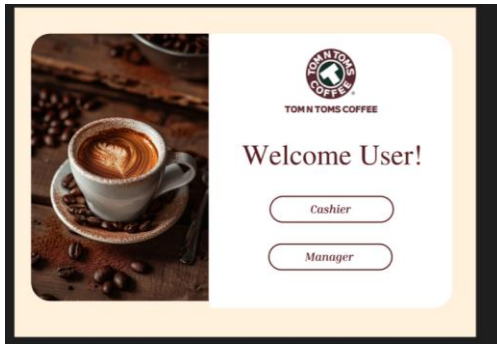
Report Dashboard

They can see summarized reports here with graphs and other notifications such as low stocks alert and upcoming stocks.
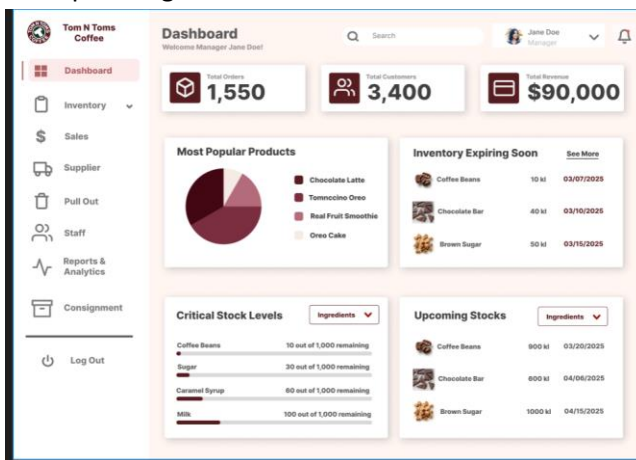
Inventory page

This page is dedicated as a inventory master list where they can see all the stocks and their status.
Purchase Order

This is where the appended stocks are seen. All the items that need purchasing (low stocks alert) will be forwarded here.
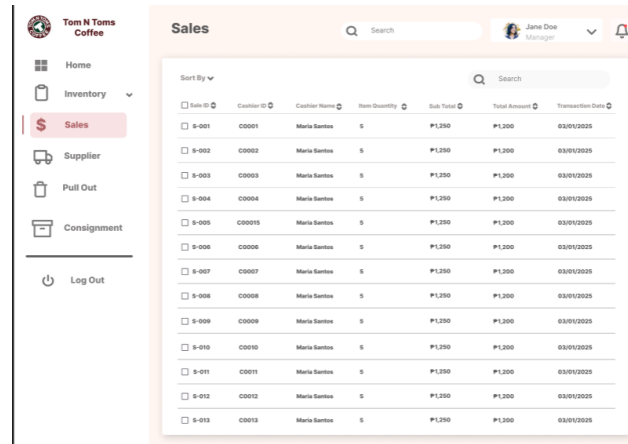

Point of sales

This page will be used to take orders, at the same time keep track of the sales and the ingredients being used.
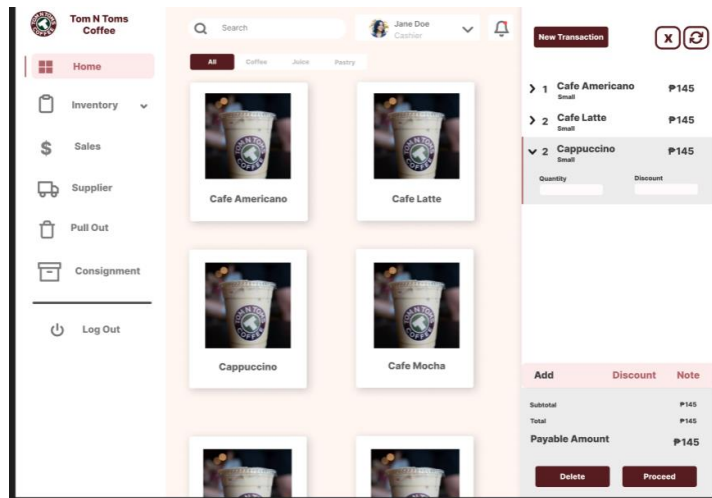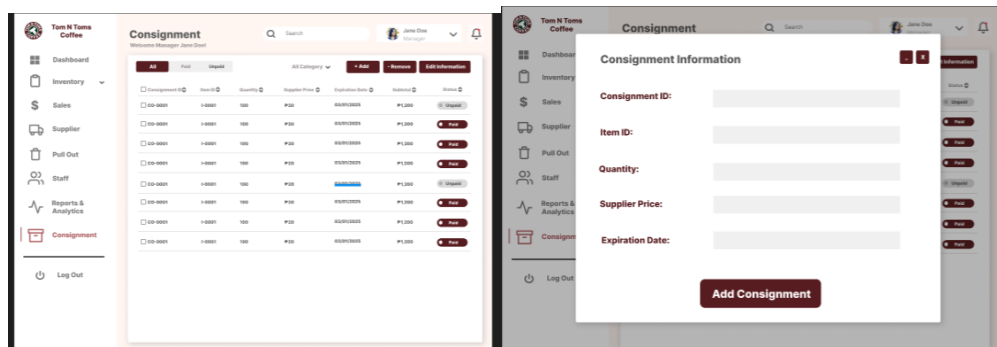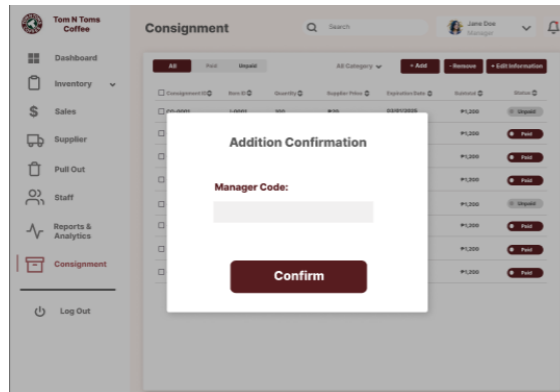

Sales page

This page will keep a history of transactions (items sold).
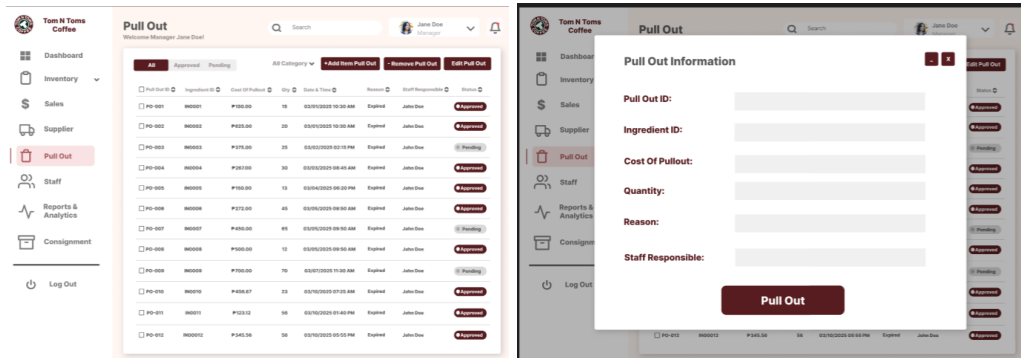

Consignment

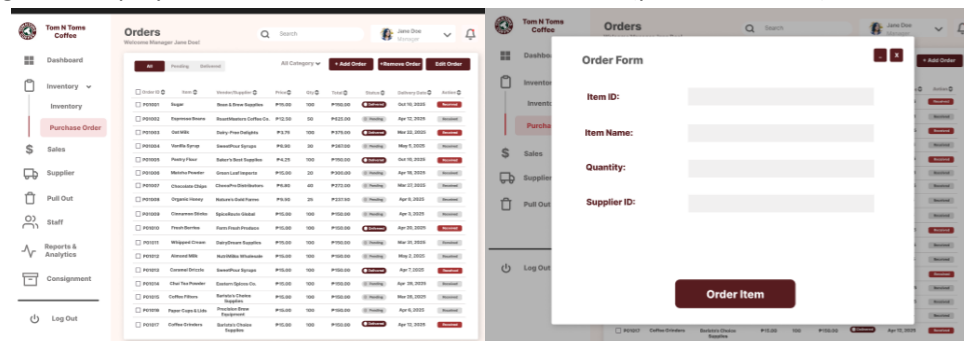This page is given the option to keep track of consignments depending on the agreement with the suppliers.
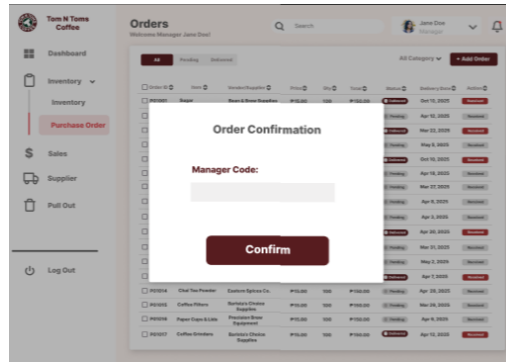
Pull out Page

This page will display the appended items that need to be pullout.
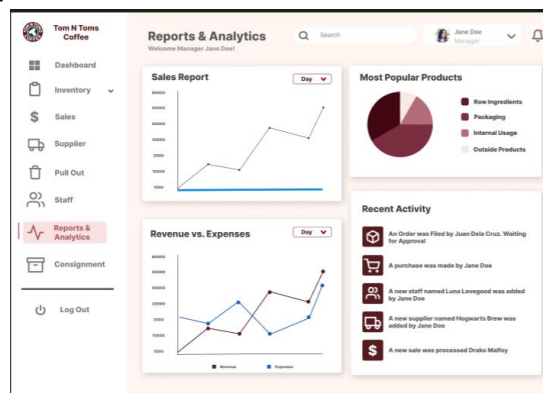

Purchase Order Page

This page will display the the items that are in need of a PO (purhcase order).

Reports and Analytics

Visual graphs and activity audit is seen here.

D. **Evaluation of prototype**

Use heuristic evaluation with format given below. This is the criteria of how the design will be graded. **(Select the best design among 3 to 5 alternative designs within your team and evaluate)**

Evaluation Criteria (Based on the 10 heuristics of design evaluation)

Area of Evaluation	5	4	3	2	1
A. **Visibility of System Status** - The system design provides appropriate feedback like message prompts in response to user actions.	x				
- The message prompts are clear, visible and understandable.	x				
B. **Match between the system and the real world** - Used words, phrases and concepts according to users' language rather than system oriented words and computer jargons.	x				
C. **User control and freedom** - The system design provides ways of allowing users to easily "get in" and "get out" if they find themselves in unfamiliar parts of the system.	x				

Criteria					
D. Consistency and Standards - The colors, text, labels, buttons and other elements in the design are uniform from start to finish**.**	x				
- Text and icons are not too small or too big.	x				
- Menus and other features of the system are arranged and positioned in a consistent way. (For ex. If your website has navigation buttons on the top under the page title on one page, the users will automatically look there for the same features on other pages.	x				
E. Error Prevention - The system design provides an automatic detection of errors and preventing them to occur in the first place.	x				
- Idiot proofing mechanisms are applied	x				
F. Help users recognize, diagnose and recover from errors **-** Error messages and the terms used are recognizable, familiar and understandable for the users.	x				
G. Recognition rather than recall **-** Objects, icons, actions and options are visible for the user. - Objects are labeled well with text and icons that can immediately be spotted by the user and matched with what they want to do.	x				
H. Flexibility and efficiency of use - The system design provides easy to navigate menus. - the system does not make wasteful time of system resources.		x			
I. Aesthetic and minimalist design **-**Graphics and animations used are not difficult to look at and does not clutter (mess) up the screen. - Information provided is relevant and needed for the system design.	x	x			
J. Help and Documentation **-**the system design provides information that can be easily searched and provides help in a set of concrete steps that can easily be followed.		x			

Chapter III. Conclusion and Recommendation

Conclusion

The Tom N Toms Inventory Management System was created to help solve the central issues the business faced with manual inventory management, including inaccurate inventory stock records, placing orders too late to be restocked, and reporting issues. The team followed the User Centered System Design (UCSD) model for the project, to ensure that the system was developed based on the actual needs, behavior and workflows of the users. The resulting system facilitates an efficient and organized environment for users to manage inventory, track movements of items, reporting evaluations and to notify employees of items needing re-ordering.

Through interviews, surveys and observations, it was evident within the organization that staff at the store level believed the system should be straightforward, accurate, and a reliable system. The final application meets all of these expectations by providing users with simple input forms, role-based login, real time data access, and a low learning curve. The application is also created to be scalable, allowing for future integration of more modules such as suppliers or automated ordering systems.

Recommendation

To further improve the system and its impact on store operations, the following recommendations are proposed:

1. Add Notification System: Implementing real-time alerts (e.g., pop-ups or emails) for low stock and expiring items can further reduce operational risks.

2. Integrate Bar-Code Scanning: For faster data input and retrieval, integrating barcode scanning functionality would be highly beneficial, especially during high-volume operations.

3. Periodic System Evaluation: Regular evaluation of the system based on user feedback will help in identifying new pain points and opportunities for enhancements.