Project Report Format

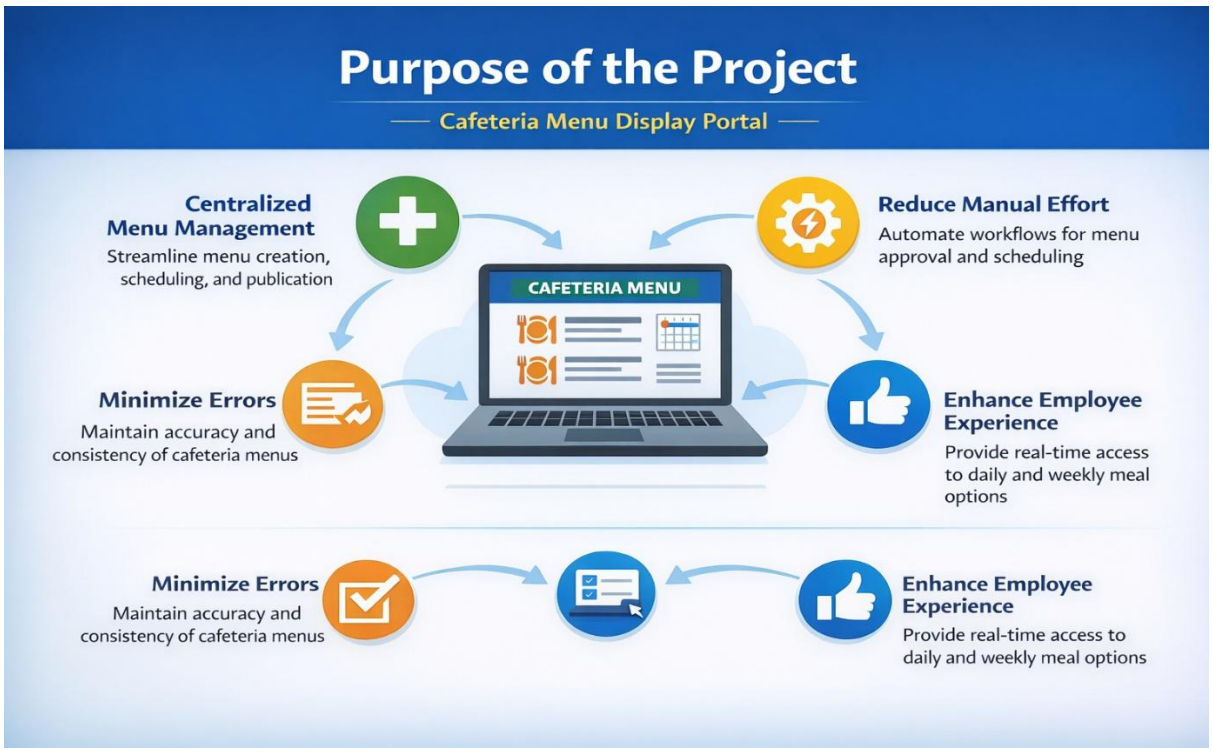
1. INTRODUCTION

1.1 Project Overview

The **Cafeteria Menu Display Portal** is a web-based application developed on the **ServiceNow platform** to manage, publish, and display cafeteria menus within an organization. It allows administrators to create, update, schedule, and publish menus, while employees can easily view daily or weekly meal options in real time.

1.2 Purpose

The main purpose of this project is to simplify cafeteria menu management, reduce manual communication, avoid errors, and improve employee awareness about available meals. It ensures that menus are accurate, timely, and easily accessible.



---

2. IDEATION PHASE

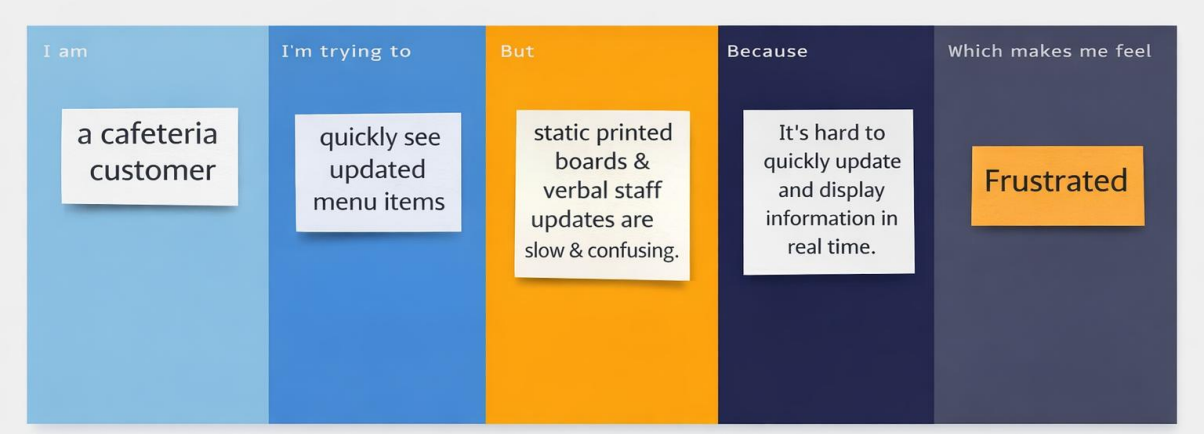
2.1 Problem Statement

Customer Problem Statement :

In many cafeterias, menu information is currently displayed using static printed boards or verbal communication from staff. These methods make it difficult to update menu items, prices, availability, and special offers in real time. As a result, customers often face confusion, long waiting times, and incorrect order placement. Cafeteria staff also spend extra effort repeatedly explaining menu details, leading to inefficiency and reduced customer satisfaction.

There is a need for a **digital cafeteria menu display system** that can dynamically show updated menu items, prices, availability status, daily specials, and announcements in a clear and attractive manner. The system should be easy to update, cost-effective, and capable of improving customer experience while reducing staff workload and operational errors.

I am	A cafeteria customer who wants to easily see and choose menu items
I'm trying to	Quickly find menu items, prices, and any special offers
	Static printed boards and verbal staff communication make it hard to get accurate, up-to-date information.
but	Menu updates are slow, confusing, and not displayed clearly.
because	Menu updates are slow, confusing, and not displayed clearly.
which makes me feel	**Confused, frustrated, and stressed** as I wait and struggle to order correctly.



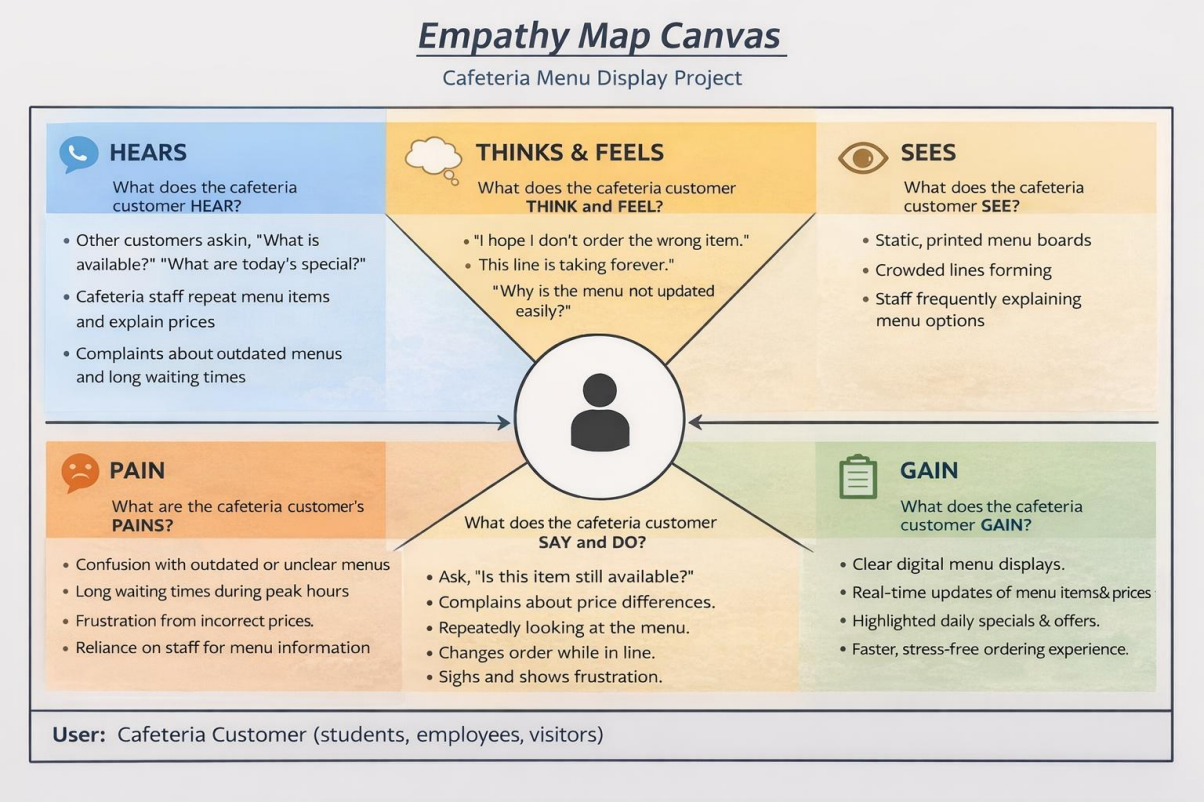
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A student	Quickly decide what to have for lunch	Menu is available only on a static, hard to read board far from the counter	I have limited time during my break and can't easily see all options or nutritional info	Frustrated and rushed
PS-2	A cafeteria staff member	Update the daily specials and prices efficiently	I have to manually print and replace the paper signs every morning	It is time-consuming, wasteful, and prone to errors	Stressed and inefficient

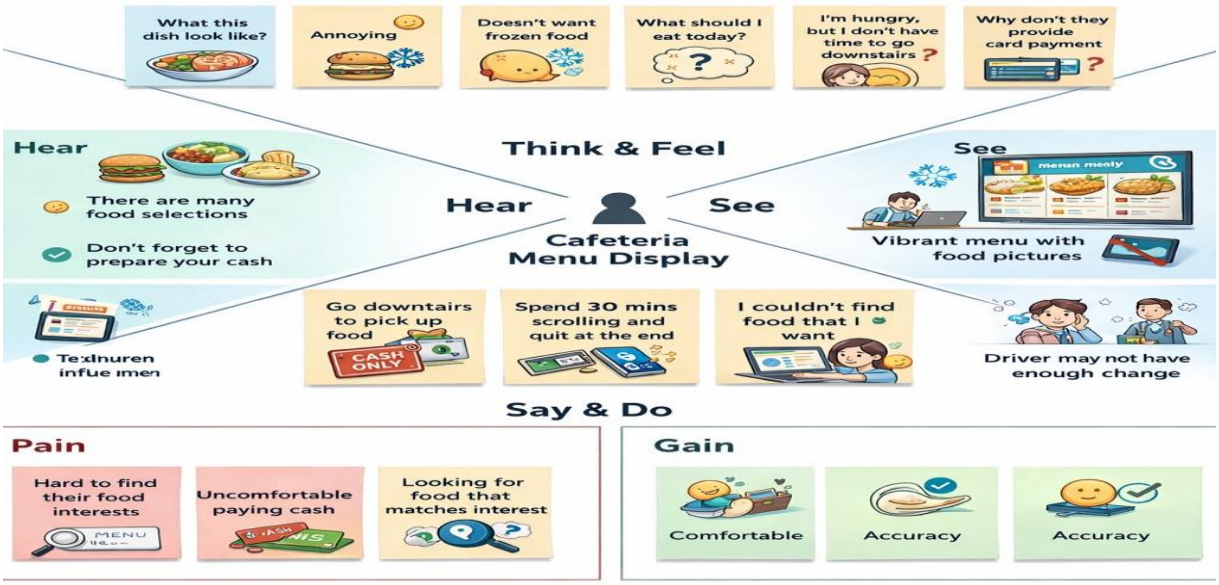
---

2.2 Empathy Map Canvas

Users: Employees, Cafeteria staff, Administrators

- **Says:** "What food is available today?"
- **Thinks:** "I hope there is something suitable for my diet."
- **Does:** Checks notice boards or asks others
- **Feels:** Frustrated when information is missing or outdated





2.3 Brainstorming

Brainstorm & Idea Prioritization :

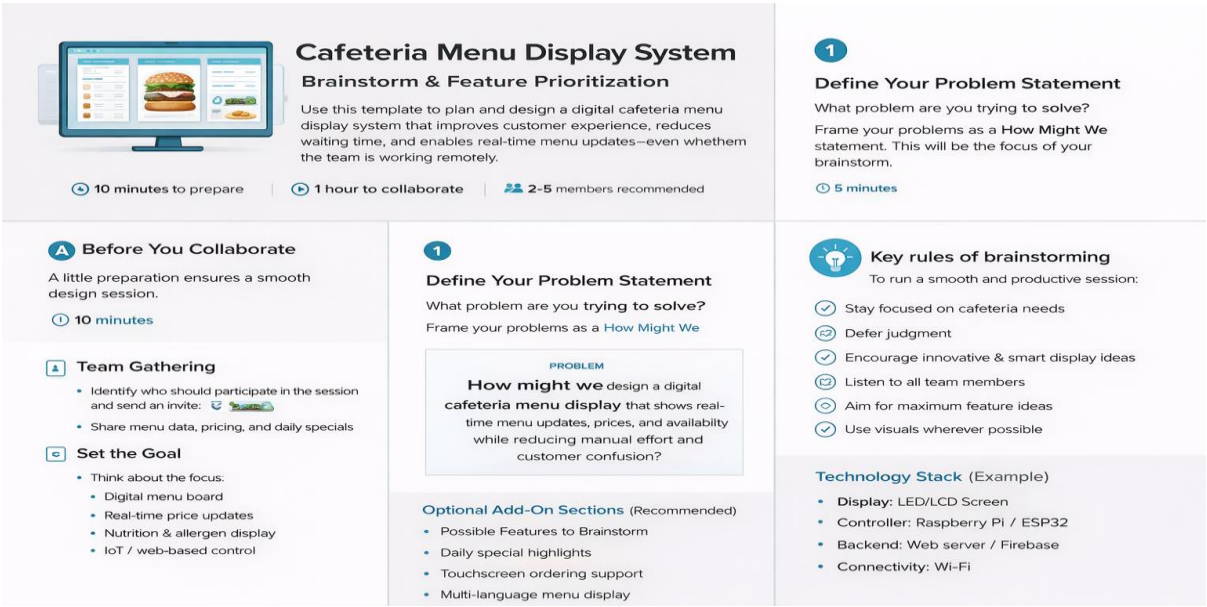
Brainstorming for a cafeteria menu display system should focus on improving customer experience, operational efficiency, and engagement. High-impact foundational ideas include real-time digital

menu boards, nutrition and allergen transparency, multilingual support, daily specials highlights, and POS integration to manage sold-out items. More advanced options include inventory-aware automation, dynamic pricing to reduce waste, AI demand forecasting, personalized recommendations, and sustainability indicators. When prioritizing, use an impact-versus-effort framework: implement high-impact, low-effort features first (e.g., digital boards and allergen icons), plan strategically for high-impact but complex integrations (e.g., AI forecasting), and deprioritize costly low-impact innovations.

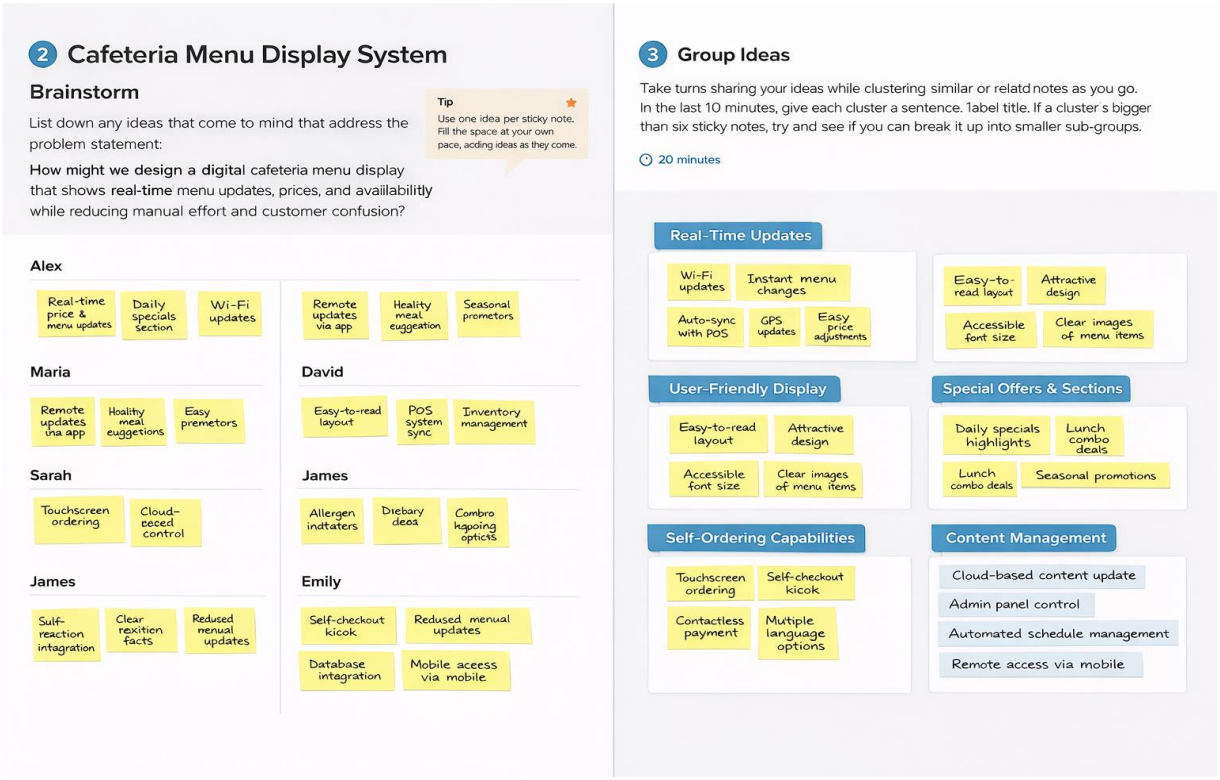
The ideal roadmap depends on the cafeteria context (school, corporate, hospital, or food court), but a phased approach—starting with core visibility and operational reliability, then optimizing, then differentiating—ensures practical and scalable implementation.

Reference: https://www.mural.co/templates/brainstorm-and-idea-prioritization

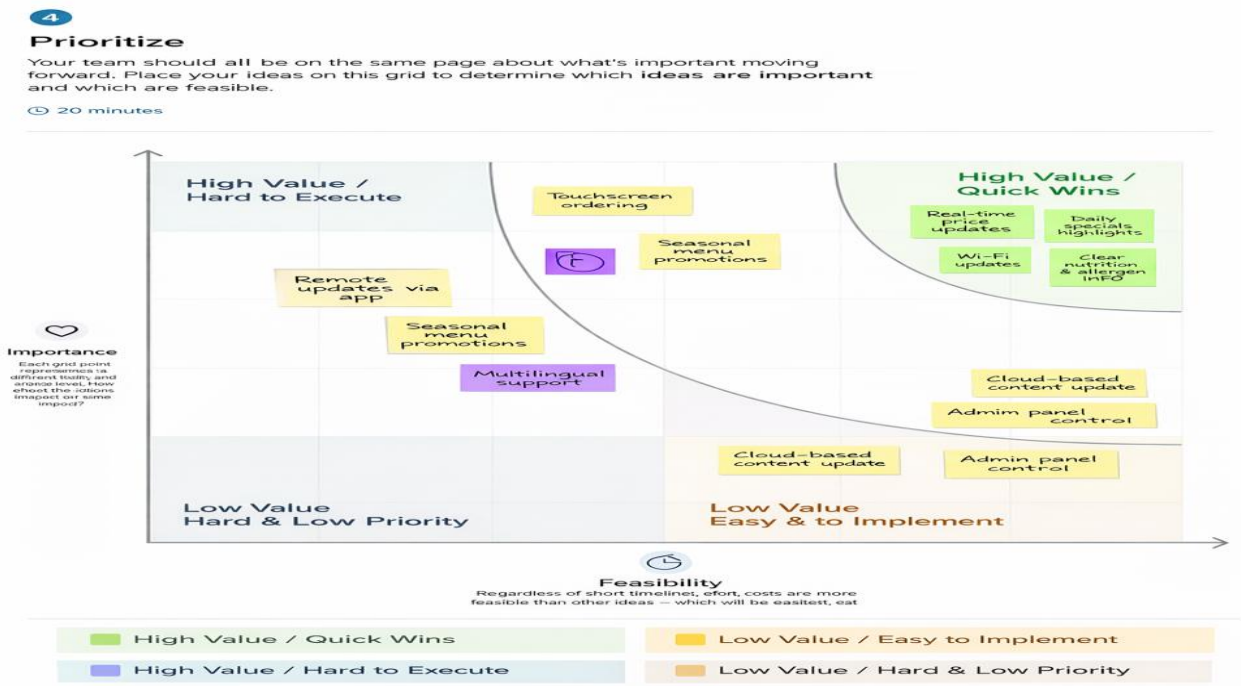
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization:



3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. Employee opens portal
2. Views available menus
3. Checks meal details and date
4. Plans meal accordingly

Administrator journey:

1. Create new menu
2. Submit via Service Catalog
3. Publish menu
4. Monitor reports

3.2 Solution Requirements

Functional Requirements:

- Create and manage menus
- Submit menus via catalog form
- Publish menus
- View menus by date
- Generate reports

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form, Gmail
FR-2	User Authentication	Confirmation via Email & OTP
FR-3	Menu management	App/Update/Delete Categories & Items
FR-4	Menu display	Real-time Updates & scheduling
FR-5	Order processing	Cart management & Selection
FR-6	Payment & billing	Digital billing & Payment gateway

Non-Functional Requirements:

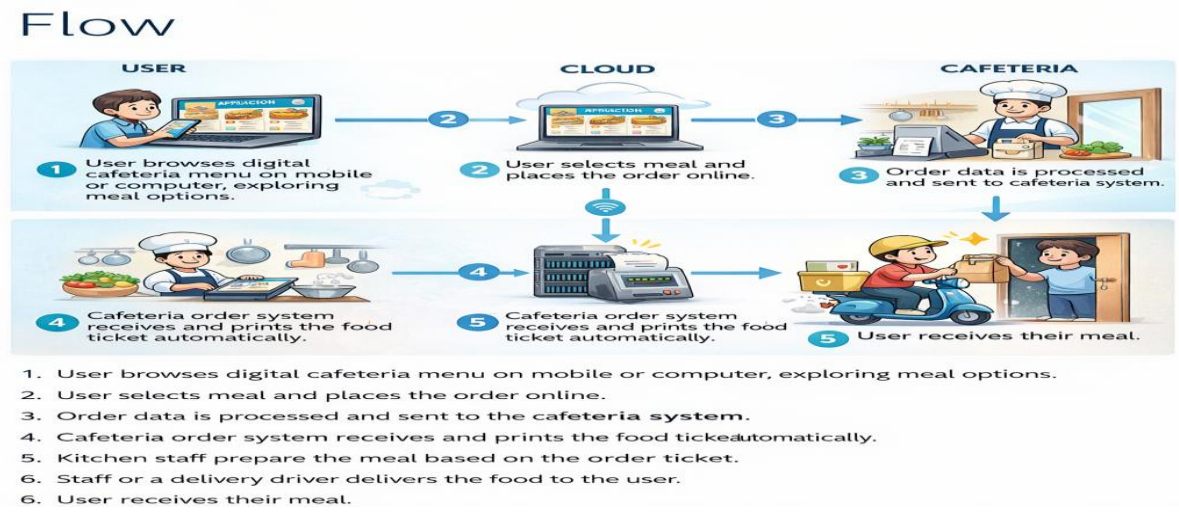
- Easy to use interface
- Secure access
- Real-time updates
- Reliable performance

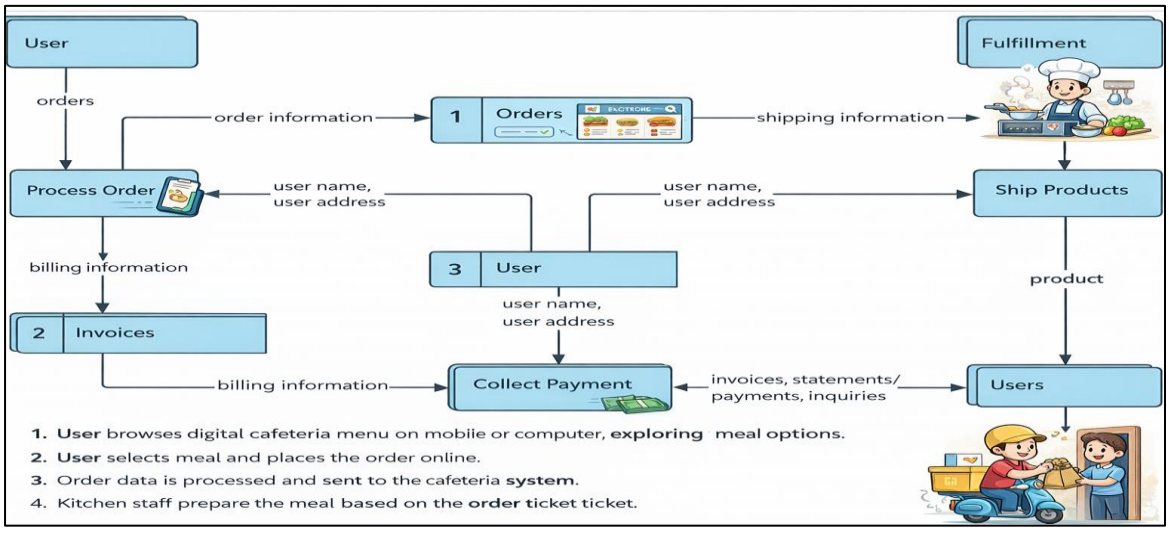
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The interface must be intuitive and user-friendly, allowing customers to navigate and view menu items with minimal effort.
NFR-2	**Security**	The system must protect sensitive data from unauthorized access and ensure the integrity of the displayed menu information.
NFR-3	**Reliability**	The system should perform consistently without frequent failures, ensuring that the displayed menu remains accurate and updated during all operating hours.

NFR-4	**Performance**	The display should be highly responsive with fast loading times for menu updates or page transitions.
NFR-5	**Availability**	The system must have the high uptime being accessible to users whenever the cafeteria is open.
NFR-6	**Scalability**	The system should be able to handle an increase in menu items, display screens, or concurrent users without any loss in performance.

3.3 Data Flow Diagram





3.4 Technology Stack

- **Platform:** ServiceNow
- **Backend:** Server-side scripting (ServiceNow)
- **Database:** ServiceNow Tables
- **UI:** Service Portal and Forms
- **Reporting:** ServiceNow Reports & Dashboard

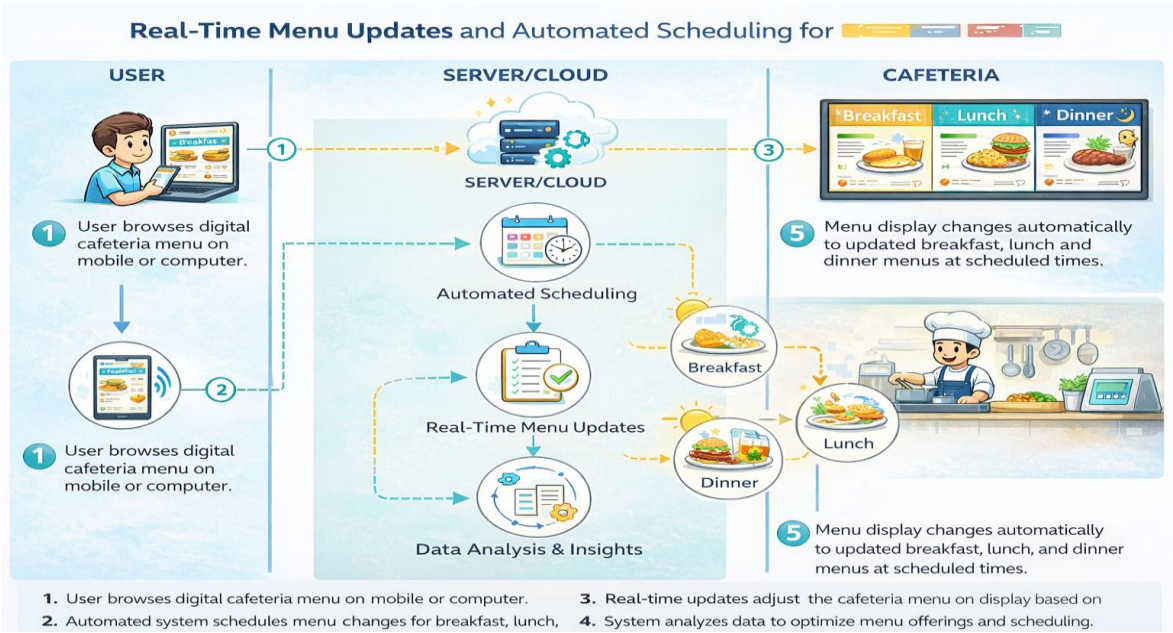


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Digital signage display for customers and a dashboard for cafeteria staff to update menus.	HTML, CSS3, React Js/Vue Js etc.
2.	Application Logic-1	Core logic for menu management, price updates, and scheduling	Node Js/ Python
3.	Application Logic-2	Real-time synchronization service to ensure all display screens update instantly when a change is made.	WebSockets/Socket.io

4.	Application Logic-3	Image processing service to optimize and display food item photos on the menu.	Cloudinary API/Sharp
5.	Database	Stores menu items, descriptions, prices, nutritional info, and availability status.	PostgreSQL/MongoDB
6.	Cloud Database	Remote backup and synchronization for multi-location cafeteria management.	Firebase real-time database/AWS DB
7.	File Storage	Storage for high-quality food images and promotional videos shown on the displays.	AWS S3/ Google Cloud Storage
8.	External API-1	Integration with a payment gateway if the display includes a QR code for self-checkout.	Stripe API/ Razorpay API
9.	External API-2	Weather or news API to display localized content alongside the menu to engage customers.	OpenWeatherMap API
10.	Machine Learning Model	Recommendation engine to suggest “daily specials” based on historical sales data or time of day.	TensorFlow.js / Scikit-learn
11.	Infrastructure (Server / Cloud)	Hosting for the backend API and the web-based display interface.	AWS EC2/ Heroku / Vercel

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used to build the responsive menu interface and backend.	**Frontend**: React.js or Vue.js with boot strap for responsive design. **Backend**: Node.js or Django

S.No	Characteristics	Description	Technology
2.	Security Implementations	List all the security / access controls for menu management	**Authentication**: JWT or IAM for role-based access. **Network**: Secure Wi-Fi with firewalls and HTTPS/TLS for data encryption.
3.	Scalable Architecture	Justify the scalability for handling multiple display screens across different cafeteria sections.	**3-Tier Architecture**: Independent presentation, logic , and data tiers. **Microservices**: Separate service for real-time menu updates.
4.	Availability	Justify how the menu stays live during high-traffic lunch hours or server issues.	**Load balancers**: Nginx or AWS ELB to distribute requests across multiple servers. **Offline mode**: Local caching on displays to show the last known menu if the internet fails.
5.	Performance	Design consideration to ensure menu images and prices load instantly on all screens.	**Caching**: Redis for fast retrieval of the current daily menu. **CDN**: Using a Content Delivery Network to serve high-resolution food images with low latency.

4. PROJECT DESIGN

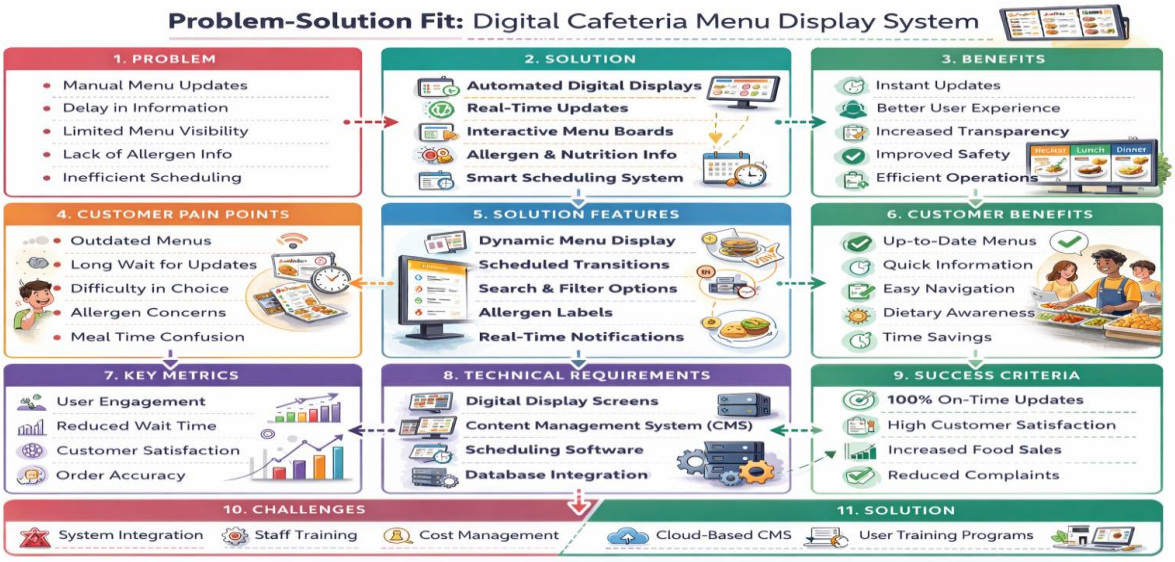
4.1 Problem Solution Fit

The **problem–solution fit** for the cafeteria menu display project lies in addressing the inefficiency of traditional menu boards, which are often static, outdated, and difficult to update in real time, leading to customer confusion, long queues, and increased workload for staff.

The proposed **digital cafeteria menu display system** directly solves this problem by providing a dynamic, centralized platform where menu items, prices, availability, offers, and nutritional details can be updated instantly and displayed clearly on digital screens. This ensures accurate information, improves transparency, enhances customer decision-making, and reduces dependency on verbal communication.

Purpose:

- To provide real-time updates of menu items, prices, and availability.
- To reduce customer confusion caused by outdated or unclear menu information.
- To minimize waiting time and overcrowding at ordering counters.
- To reduce staff workload by eliminating repeated verbal explanations.
- To improve accuracy in displaying food items and pricing details.
- To enhance the overall customer experience through clear and attractive digital displays.
- To enable easy modification of menus during peak hours or special occasions.



4.2 Proposed Solution

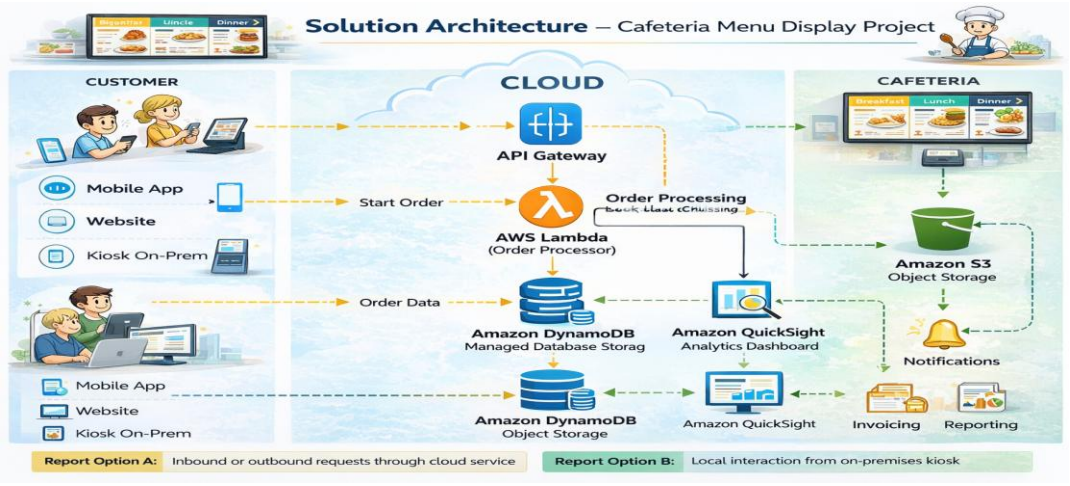
Develop a ServiceNow application that includes:

- Custom table for menus
- Service Catalog item for submission
- UI Action for publishing menus
- Reports for monitoring

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Traditional static menus in cafeterias are difficult and costly to update, leading to customer confusion when items are sold out or prices change. High-traffic environments suffer from long queues due to decision fatigue caused by cluttered layouts.
2.	Idea / Solution description	Implementation of high-resolution digital menu boards integrated with a Content Management System (CMS). This allows for real-time updates, "dayparting" (automatically switching from breakfast to lunch), and high-quality food photography or videos to attract customers.
3.	Novelty / Uniqueness	Integration of dynamic QR codes and Augmented Reality (AR), allowing customers to view 3D models of dishes and detailed nutritional/allergen information on their own mobile devices. Use of AI-driven content to suggest promotions based on current inventory or weather.
4.	Social Impact / Customer Satisfaction	Reduces perceived wait times by up to 35% through better readability. Enhances accessibility with adjustable font sizes and multi-language support. Promotes health by clearly displaying macronutrients and allergen flags.
5.	Business Model (Revenue Model)	Primarily a B2B Subscription/SaaS model for the CMS software, alongside initial hardware sales. Additional revenue can be generated through "digital real estate" by selling advertising space to food and beverage vendors on the screens.

6.	Scalability of the Solution	Highly scalable via cloud-based management, allowing a central administrator to update menus across multiple cafeteria locations instantly. The modular software can easily expand to include self-ordering kiosks or mobile app integration as the business grows.

4.3 Solution Architecture



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Project development phases:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Menu Display Setup	USN-1	As a student, I want to view the cafeteria menu on a digital screen so that I can easily see available food items.	2	High	Team
Sprint-1	Menu Display Setup	USN-2	As a cafeteria staff member, I want to display item names and prices clearly on the screen.	1	High	Team
Sprint-2	Menu Updates	USN-3	As a cafeteria staff member, I want to update menu items daily	2	High	Team

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
			without reprinting boards.			
Sprint-2	Menu Updates	USN-4	As a student, I want to see today's special items highlighted on the menu display	2	Medium	Team
Sprint-3	Admit control panel	USN-5	As an admin, I want to log in and update menu items, prices, and availability easily.	3	High	Team
Sprint-3	Admit control panel	USN-6	As an admin, I want to mark food items as "out of stock" so that students see only available items.	2	High	Team
Sprint-4	User information display	USN-7	As a student, I want to see calorie or ingredient information for each menu item to make healthier choices.	3	Medium	Team
Sprint-4	System reliability	USN-8	As a cafeteria manager, I want a menu display to want the menu display to update automatically in real-time to avoid incorrect information.	5	High	Team

Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022		
	20	6 Days				
	20	6 Days				
	20	6 Days				
	20	6 Days				

Velocity:

Assume the cafeteria menu display project has a 10-day sprint, and the team completes 20 story points in one sprint.The team's average velocity helps estimate how many menu features (display, updates, admin control) can be completed per day.

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burndown Chart:

A Burndown Chart in the cafeteria menu display project shows the remaining story points versus time to track sprint progress.

It helps the team ensure features like digital menu display and real-time updates are completed on schedule.

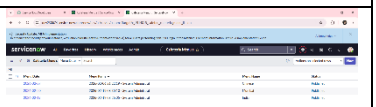
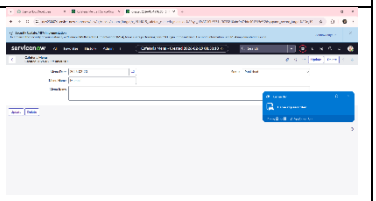
---

6. FUNCTIONAL AND PERFORMANCE TESTING

Testing ensured that all features work correctly.

Tested modules:

- Menu submission
- Menu storage
- Publishing action
- Menu display
- Report generation

S.No.	Parameter	Values	Screenshot
1.	Model Summary	**85.0%-95.0% (**overall accuracy for combined features)	
2.	Accuracy	Training Accuracy – 90.31% Validation Accuracy -90.0%	
3.	Fine Tunning Result	Validation Accuracy -89.6%	

6.1 Performance Testing

- Verified system responsiveness
- Tested multiple menu entries
- Ensured quick retrieval of menu data
- Confirmed stability under normal usage

Testing Period: Jan 19 2026 to Feb 25 2026

Testing Scope:

Features to be tested: Display menu items, Update menu items, filter by dietary restrictions, admin login

User stories: As a customer, I want to see today's menu; As a admin, I want to update prices, etc.

Testing Environment:

URL/Location:

https://dev230674.servicenow.com/now/nav/ui/classic/params/target/x_191401_cafeteri_cafeteria_menu_list.do

Credentials: kalimandlasoniya@gmail.com

Test Cases:

Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Pass/ Fail
TC-001	Daily menu visibility	1. Open home screen. 2. Check for current day's menu.	Daily menu items display with correct prices and images	Correct items displayed.	Pass
TC-002	Search functionality	1. Enter a specific food item name in the search bar.	Search result should show the exact item or similar matches.	Item found instantly.	Pass

Bug Tracking:

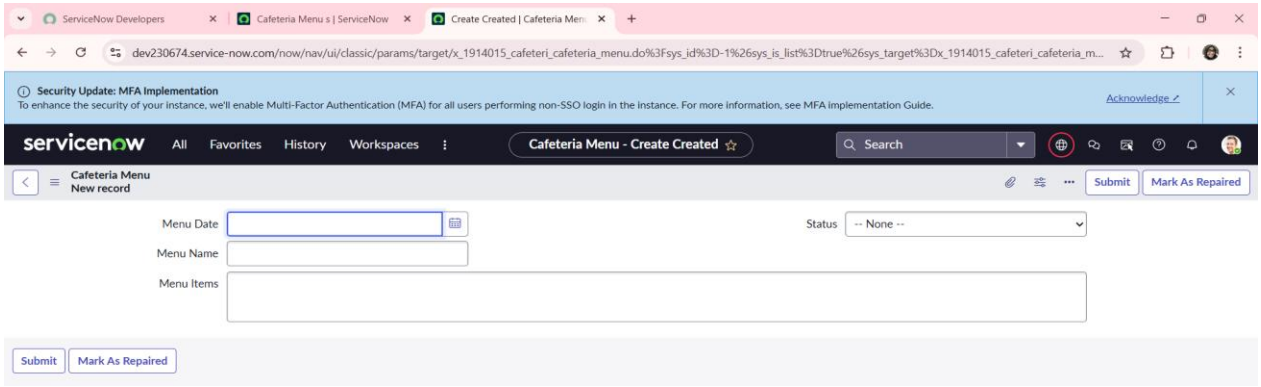
Bug ID	Bug Description	Steps to reproduce	Severity	Status	Additional feedback
BG-001	Menu goes blank while the cafeteria's Wi-Fi connection is lost.	1.Disconnect the display from local network. 2. observe the screen's behaviour.	Medium	In progress	Should implement local content caching for offline functionality.
BG-002	Menu items fail to update after changes are saved in the admin panel.	1.login as admin. 2.edit an item's price 3.save changes and check the display.	High	Open	Likely a data synchronizatioin or caching issue between the CMS and display.

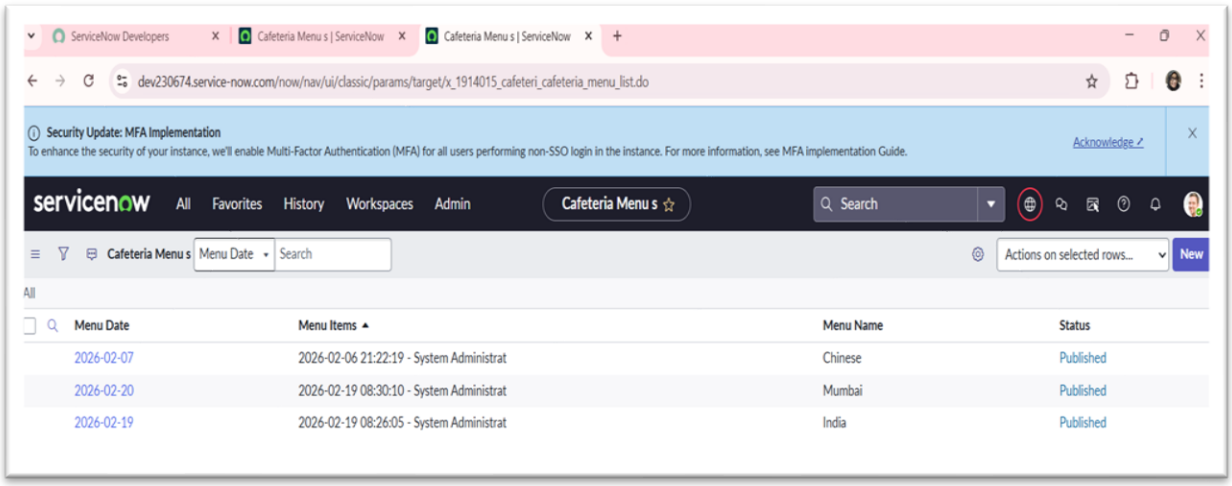
7. RESULTS

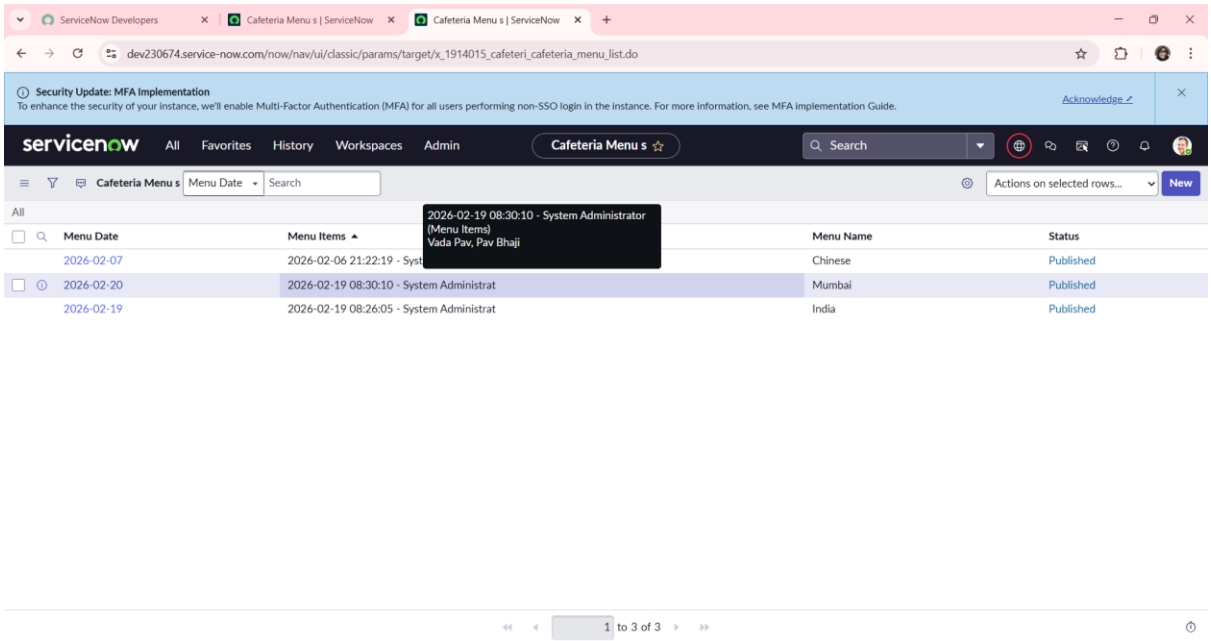
7.1 Output Screenshots

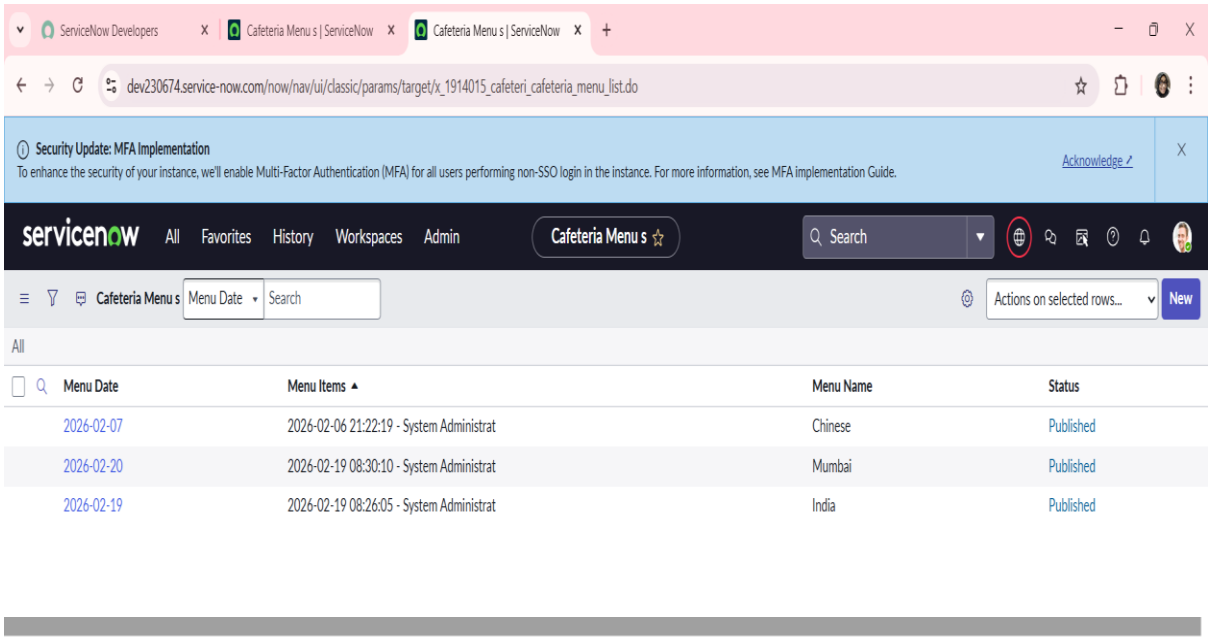
The system successfully produced:

- Service Catalog submission form
- Cafeteria menu table records
- Published menu display
- Dashboard report grouped by date









8. ADVANTAGES & DISADVANTAGES

Advantages:

- Centralized menu management
- Real-time updates
- Reduced manual effort
- Improved employee satisfaction

- Accurate scheduling

Disadvantages:

- Requires ServiceNow access
- Dependent on internet connectivity
- Limited customization without development
- Manual publishing required

---

9. CONCLUSION

The Cafeteria Menu Display Portal provides an efficient solution for managing and publishing cafeteria menus within an organization. By automating menu submission, publication, and reporting, it reduces administrative workload and enhances employee engagement. The system demonstrates how digital platforms can improve operational efficiency and communication.

---

10. FUTURE SCOPE

Possible enhancements include:

- Automated approval workflow
- Mobile app support
- Dietary filters and allergen information
- Notifications for new menus
- Feedback and rating system
- Integration with payment or pre-ordering systems

---

11. APPENDIX

Source Code:

Configuration scripts and ServiceNow components used in the application.

Dataset Link:

Not applicable (data generated within the system).

GitHub & Project Demo Link:

- **GitHub Repository:**
  https://github.com/Kalimandlasoniya/cafeteria-menu-display
- **Live Demo:**

  https://drive.google.com/file/d/1MIeXgdu8q7ms7uFn7FqHVK5idhCDatwR/view?usp=drivesdk