iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** X **Month of publication:** October 2024

DOI: https://doi.org/10.22214/ijraset.2024.64674

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue X Oct 2024- Available at www.ijraset.com

Foodies Full Stack Web Application: Connecting You to Your College Canteens

Swaraj Pawar[1], Shreyash Patil[2], Aditya Modak[3], Ayush Phapale[4], Navnath Bagal[5]
JSPM - TSSM\'s Padmabhooshan Vasantdada Patil Institute of Technology, Pune

Abstract: ***The "Foodies Full Stack Web Application" is designed to revolutionize the way college students interact with their campus canteen services by providing real-time access to menus, nutritional information, and personalized food recommendations. This project aims to bridge the gap between canteen owners and students, offering seamless communication and better decision-making for daily meals. By leveraging the power of the Spoonacular API, the platform can not only display available menu items but also offer detailed nutritional data, which is crucial for students with dietary preferences or restrictions. Additionally, the application uses machine learning to suggest dishes based on individual preferences, ensuring a tailored dining experience for each user. This project has been developed using modern web development technologies, integrating both front-end and back-end functionalities to create a responsive, user-friendly platform. The application has the potential to enhance user satisfaction, improve the efficiency of canteen operations, and promote healthier eating habits among students. This paper outlines the design, implementation, and testing of the Foodies Web Application, while also discussing future improvements and scalability.***

I. INTRODUCTION

In today’s fast-paced campus environments, college canteens serve as a primary hub for students to quickly access food and beverages. However, students often face challenges in obtaining up-to-date information about what is available on the menu, how nutritious their options are, or whether there are any new dishes or promotions they might like to try. Similarly, canteen owners struggle with efficiently managing inventory, predicting demand, and understanding customer preferences to improve their services. These challenges highlight the need for a system that can address both student and canteen owner needs in a dynamic, accessible way. The "Foodies Full Stack Web Application" was conceived as a solution to these problems, with a goal of streamlining the interaction between students and canteen services. The application not only offers real-time access to menus but also integrates nutritional information and personalized recommendations, creating an ecosystem where students can make informed choices about their meals. With the help of the Spoonacular API, the platform retrieves detailed nutritional data for each menu item, providing essential information such as calorie count, macronutrients, and potential allergens. This is particularly valuable for health-conscious students or those with specific dietary restrictions, such as vegetarians or individuals with food allergies.

Moreover, a machine learning component is incorporated to analyze user preferences and suggest meals that align with their tastes and health goals. By taking into account favorited dishes, and dietary restrictions, the recommendation system enhances the user experience by offering a personalized dining journey. From the perspective of the canteen owners, the application serves as a tool to better manage operations. Using built-in analytics, owners can track which dishes are most popular, monitor inventory levels, and adjust their offerings based on data-driven insights. This leads to more efficient decision-making and better resource allocation, minimizing food waste and improving profitability. Technologically, the project is built using modern full-stack web development practices. The front-end employs HTML, CSS, JavaScript, and ReactJS to ensure a smooth, responsive user experience. The back-end, developed with Node.js and Express.js, handles data storage and interactions with the Spoonacular API, while a MongoDB database is used to store user information and transaction data. The machine learning module for recommendation is integrated using Python, further enhancing the application’s functionality.

The project also focuses on ensuring a user-friendly interface that caters to both the tech-savvy and non-technical users. The deployment of the application on a web server makes it accessible across various devices, including smartphones, tablets, and desktops, allowing students to access the service from anywhere on campus.

In conclusion, the Foodies Web Application is an innovative platform aimed at reshaping the way students and canteen services interact, providing mutual benefits such as better food choices for students and more efficient operations for canteen owners. This paper will delve into the technical design, implementation, and potential improvements for the system, paving the way for a scalable solution that could be expanded beyond college campuses in the future.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue X Oct 2024- Available at www.ijraset.com

II. LITERATURE REVIEW

1) Development of a Web Application to Track the Food Quality and Service in the Hostel Mess

This study addresses the communication gap between the hostel mess committee and students regarding food quality, allergens, and menu accessibility. A Django-based web application was developed to enable students to review and suggest improvements on the hostel mess menu. The application empowers students to rate food quality, service, and hygiene, providing a feedback mechanism for mess administrators to enhance services continually. Additionally, the application allows parents to track menus and contribute suggestions regarding their children's nutrition and meal quality.

2) Leveraging Web Applications for Improved Dining Experience and Data-Driven Decision Making

The objective of this project is to design a feedback system for Hostel Mess management that will assist both the organization and the students residing in the hostel. Given the numerous issues faced with hostel mess services, it is crucial to collect feedback from students and provide necessary solutions and suggestions. This web application facilitates hostel mess management by allowing quick access to daily menu options and enabling users to vote on their meal preferences weekly. Furthermore, this system tracks the hostel mess's performance and outcomes to assess how well it meets the organization's measurable goals. It provides management with timely, safe, and confidential reports from users, aiding in the preparation and decision-making process. The primary goal is to gather user feedback regarding their experiences in the hostel mess, which is then analyzed to make informed decisions using data analysis strategies.

3) Design and Implementation of a Smart Canteen Based on Machine Learning

This paper presents the design and development of a machine learning-based cafeteria dining system that addresses two critical challenges: optimizing meal nutrition to meet students' physical needs and minimizing food waste. Utilizing neural networks and decision trees, the system offers personalized meal recommendations based on students' BMI and dietary requirements while providing cost-effective procurement strategies for canteen management. The implementation of this intelligent canteen system aims to enhance students' health outcomes and improve operational efficiency in school cafeterias.

4) Cashless Canteen Mobility Solution

This study presents the "Cashless Canteen Mobility Solution," a mobile-based platform designed to enhance canteen operations within educational institutions. The solution reduces wait times and streamlines the ordering process through an intuitive interface, allowing users to easily navigate categorized menu items. By integrating QR code technology, it facilitates efficient order processing, minimizes errors, and supports timely service. This approach alleviates the workload for canteen staff while ensuring a smooth dining experience. Key features include dynamic menu management, online payment options, and user feedback mechanisms, fostering continuous service improvement. The findings highlight the transformative impact of digital solutions in canteen management, promoting user satisfaction and operational efficiency.

5) KARE - Presto Canteen Management System with an Android Application

This study introduces the "Cashless Canteen Mobility Solution," a mobile-based platform designed to transform canteen management in educational institutions. As technology reshapes everyday life, this innovative system addresses inefficiencies in traditional canteen operations by leveraging an ARM processor, Bluetooth connectivity, thermal printing, and an Android application. The application provides a user-friendly interface for students and staff to explore menu options, manage orders, and make payments seamlessly. By integrating real-time tracking and feedback mechanisms, the system enhances operational efficiency and user satisfaction. The findings demonstrate the potential for digital solutions to revolutionize dining experiences within university communities, promoting a more organized and efficient canteen environment while ensuring that technology meets the needs of modern users.

6) The Research and Design of College Catering Information Service System

The paper explores the development of a college catering information service system in response to the challenges faced by university dining environments, particularly in the context of the increasing use of smartphones and online services among students. It identifies issues stemming from traditional catering management methods, such as long queues, limited meal options, and inadequate information dissemination, which contribute to a suboptimal dining experience.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

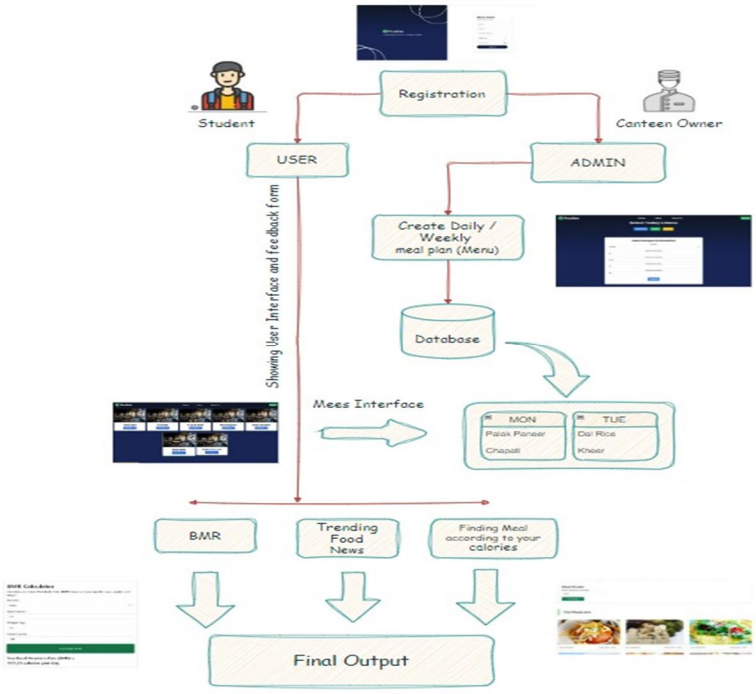
By integrating modern information technology, the proposed system aims to facilitate online meal reservations, streamline food ordering, and enhance communication between diners and management. This innovative approach not only addresses the shortcomings of existing services but also aims to improve dining efficiency, reduce food waste, and ultimately create a safer and more satisfying campus dining atmosphere.

III. PROPOSED APPROACH

The Foodies Full Stack Web Application aims to revolutionize the college dining experience by leveraging modern web technologies and user-centric design principles. The application will be built using a full stack architecture that encompasses both front-end and back-end technologies. For the front-end, React.js will be employed to create a dynamic and responsive user interface, featuring components such as a user-friendly meal selection and ordering system, real-time updates on meal availability, and user authentication and profile management. On the back-end, Node.js with an Express.js framework will facilitate efficient handling of API requests, managing a RESTful API for communication between the front-end and server, database interactions using MongoDB to store user data and order histories, as well as ensuring secure authentication and authorization of user data.

The application will include key features designed to enhance the dining experience, such as online meal ordering, which allows users to browse menus and customize their meals, thereby reducing wait times; meal reservation options to ensure preferred meals are ready for pickup; real-time notifications regarding order status; user reviews and ratings to help others make informed choices and provide feedback to the catering management team; and an admin dashboard for managing menus and tracking inventory. The implementation of the Foodies Full Stack Web Application will follow an agile methodology, enabling iterative improvements based on user feedback. The development process will unfold in several phases: beginning with requirement gathering and prototyping through user surveys and wireframes, followed by concurrent front-end and back-end development with unit testing, deployment on a cloud platform for user testing, and ongoing maintenance for continuous improvement. By adopting this comprehensive approach, the Foodies Full Stack Web Application aspires to create a modern, efficient, and satisfying dining experience for students, ultimately contributing to the enhancement of campus life.

IV. SYSTEM ARCHITECTURE



The system architecture for the Foodies Full Stack Web Application is designed to effectively manage real-time user interactions, optimize canteen operations, and provide personalized meal recommendations. It comprises several interconnected components, each playing a vital role in delivering a seamless user experience. Below is an in-depth explanation of each component.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue X Oct 2024- Available at www.ijraset.com

A. Frontend Development

The front end of the application is constructed using React.js, a powerful JavaScript library that allows developers to create interactive and dynamic user interfaces.

- *User Interface (UI)*

The UI is designed with user experience in mind, ensuring it is intuitive and accessible for students. Key features include:

- Menu Browsing: Students can easily navigate through the canteen's daily menu, view meal details, and filter options based on dietary preferences (e.g., vegetarian, vegan, gluten-free).
- Personalized Recommendations: Based on user preferences and historical data, recommended meals are highlighted, making it easier for students to choose.
- Responsive Design: The application is optimized for both mobile and desktop platforms, allowing users to access it on various devices without compromising functionality.

- *State Management*
  - State management is implemented using React hooks and possibly Redux for more complex state handling. This ensures efficient data flow between components, allowing for real-time updates when a user interacts with the menu or places an order.

- *Client-Side Routing*
  - React Router is used to manage navigation between different pages (e.g., home, menu, profile) without needing a full page reload, improving performance and user experience.

B. Backend Development

The backend of the application is developed using Node.js and Express, providing a robust framework for server-side logic and API management.

- *API Management*

RESTful APIs are designed to handle requests from the front end. Key endpoints include:

- User Authentication: For user registration, login, and profile management, utilizing JWT (JSON Web Tokens) for secure sessions.
- Meal Management: CRUD (Create, Read, Update, Delete) operations for managing canteen menus, including the ability to add new meals, update existing ones, and remove items from the menu.
- Order Processing: APIs to facilitate placing orders, tracking order status, and managing payment transactions.

- *Data Processing*
  - The backend processes real-time data, ensuring that any updates (like new menu items or user feedback) are immediately reflected in the frontend.

C. Database

MongoDB is employed as the database for storing and managing various data entities:

- *Database Structure*: The MongoDB database consists of several collections, including:
  - Users Collection: Stores user information such as usernames, hashed passwords, dietary preferences, and purchase history.
  - Meals Collection: Contains details about available meals, including descriptions, ingredients, prices, and nutritional information.
  - Orders Collection: Records order details, including user ID, meal IDs, quantities, timestamps, and order status.
  - Feedback Collection: Captures user feedback and ratings for meals to help improve menu offerings and user satisfaction.

- *Data Access Layer:*
  - A data access layer, potentially implemented using Mongoose, simplifies interaction with MongoDB, enabling easy data manipulation and retrieval while ensuring data integrity.

©IJRASET: All Rights are Reserved

D. API Integration (Spoonacular)

The system integrates with the Spoonacular API, a comprehensive resource for nutritional data and meal suggestions.

- *Nutritional Information*
  - The integration allows the application to fetch detailed nutritional information for each meal, helping users make informed dietary choices based on their health goals.

- *Meal Suggestions*
  - The Spoonacular API also provides meal recommendations based on the canteen's menu, enhancing the user experience by offering alternatives that align with user preferences and dietary restrictions.

E. Machine Learning for Dish Recommendation

A machine learning model is implemented to enhance the personalization of the dining experience.

- *Data Collection*
  - The system collects user data, including preferences, past purchases, and feedback, to train the model.

- *Recommendation Engine*
  - The model analyzes this data to provide personalized dish recommendations. Techniques such as collaborative filtering or content-based filtering could be used to suggest meals that are likely to appeal to individual users.

- *User Satisfaction*
  - By delivering tailored meal suggestions, the machine learning model significantly improves user satisfaction, encouraging repeat usage of the application.

V. FUTURE SCOPE

The Foodies Full Stack Web Application presents several opportunities for enhancement and expansion. Future work includes implementing poll functionality to allow students to vote on menu items, fostering engagement and catering to preferences. An expanded feedback system could create structured channels for student input, facilitating continuous improvement. Additionally, the application could support multi-college deployments, broadening its reach, and developing a mobile app would enhance accessibility for users. Integrating performance analytics for canteen owners could provide valuable insights into sales trends and operational efficiencies. In terms of research directions, exploring advanced machine learning models, such as hybrid recommendation systems, could improve dish suggestions. Integrating multimodal data from reviews and photos would enrich the recommendation process, while implementing real-time analytics could help canteen owners forecast demand and optimize inventory management. These initiatives aim to enhance user experience and operational effectiveness for canteens.

VI. CONCLUSION

The Foodies Full Stack Web Application represents a significant advancement in digitizing food services in educational institutions. By offering real-time menu access, nutritional information, and personalized dish recommendations through machine learning, the platform enhances the dining experience for students and improves operational efficiency for canteen owners.

This integration allows students to make informed dietary choices while enabling canteen operators to optimize their offerings based on customer preferences, thus reducing food waste and enhancing satisfaction.

Future research will focus on refining recommendation algorithms and improving scalability to facilitate broader deployment across multiple institutions. Additionally, integrating multimodal data, such as user reviews and images, will further personalize the dining experience. Overall, the Foodies Full Stack Web Application sets a strong foundation for future innovations in food service technology within educational settings.

REFERENCES

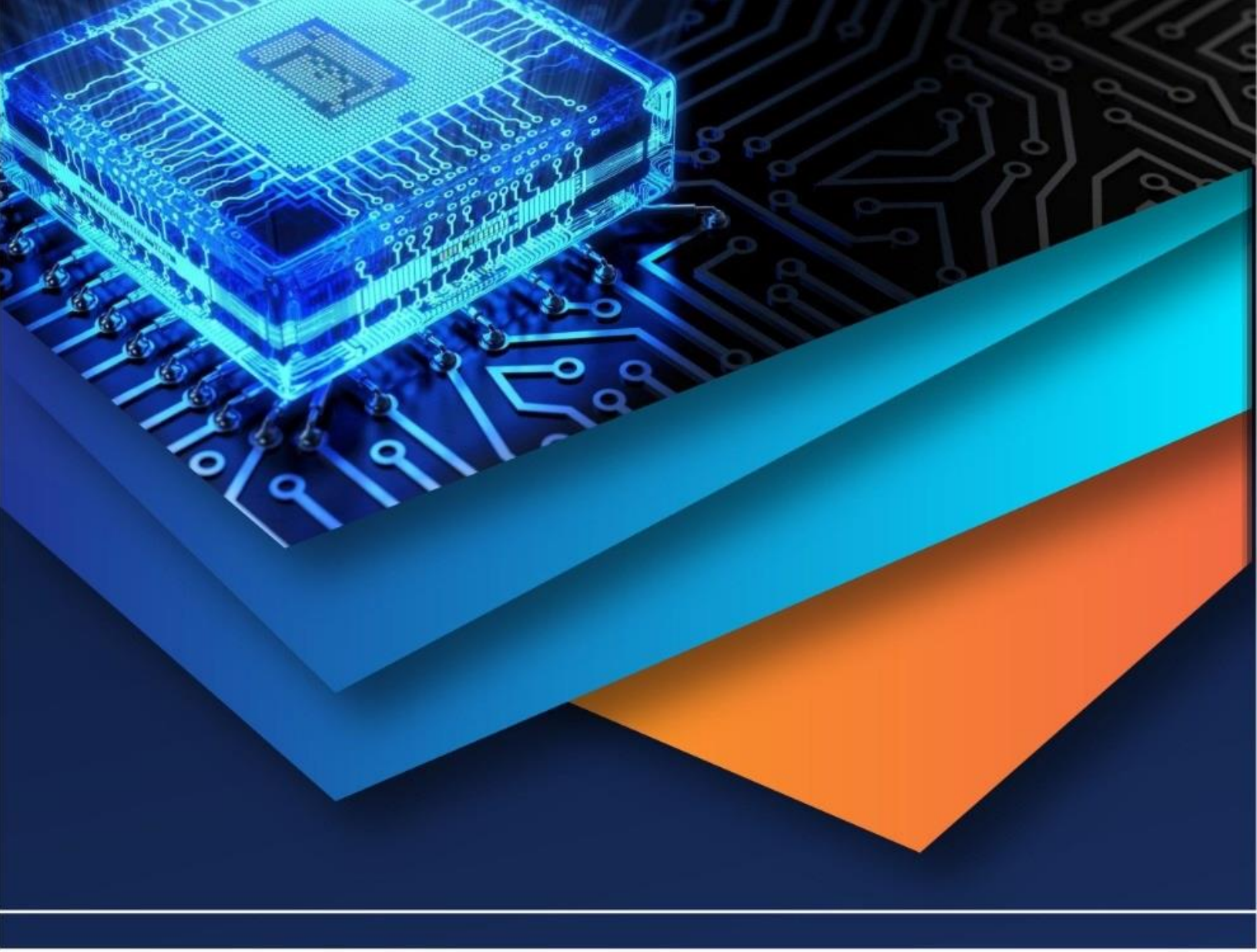
[1] Pooja Gaidhani., G.S Varsha., G.S Varsha., Jayshree Pande., Amarja Pote (2023). Development of a Web Application to Track the Food Quality and Service in the Hostel Mess. DOI: [10.1109/GCAT59970.2023.10353498]

[2] Huicen Guo., Shengran Guo., Jieli He (2022). Design and Implementation of a Smart Canteen Based on Machine Learning. DOI: [10.1109/ICCBE56101.2022.9888216]

[3] Hao Zhang (2022). The Research and Design of College Catering Information Service System DOI: [10.1109/ICISCET56785.2022.00044]

[4] P.Manikandan., K.Kotesh babu., G.Mallikarjuna Reddy., G.Kalayan., V.Muneeswaran (2023). KARE - Presto Canteen Management System with an Android Application. DOI: [10.1109/ICOEI56765.2023.10125634]
[5] S. Subhashini., R. Maruthi2., Srideivanai Nagarajan (2023). Leveraging Web Applications for Improved Dining Experience and Data-Driven Decision Making. DOI: [10.1109/ICTACS59847.2023.10390393]
[6] Neeraj Dey., Tamal Dey (2024). An approach to Cashless Canteen Mobility Solution. DOI: [10.1109/IVIT62102.2024.10692492]
[7] Masurah Mohamad., Lathifah Alfa., Nurul Farah Dieana binti Madzli (2021). Mobile School Canteen Food Ordering System. DOI : [10.24191/mij.v2i2.16142]
[8] Tanay Bagayatkar., Shivam Pawar., Vishal Salvi., Kiran Gawande (2022). Virtual Smart Canteen System. DOI: 10.1109/SPICES52834.2022.9774187
[9] Zixuan Xu., Xuhao Zhao., Zhiyu Tian., Zhenhua Zhuang., Jiaqi Wang (2020). The design of nutrition ordering system without queuing in the college canteen. DOI: [10.1109/CIBDA50819.2020.00092]
[10] Scott Taylor., Jr. (2020). Campus dining goes mobile: Intentions of college students to adopt a mobile food-ordering app, Journal of Foodservice Business Research. DOI: [10.1080/15378020.2020.1814087]

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)