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An Online-Based Food Ordering System for T&K Eatery in Ughelli North Delta State Nigeria

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ABSTRACT

Information technology, particularly online ordering platforms, has enabled small businesses to compete effectively with larger ones by automating processes. However, existing methods often face inefficiencies such as long wait times, lack of meal information, excessive printing, staff fatigue, and poor delivery. Efforts were made to automate the ordering process to address these challenges and improve profitability, market share, and customer satisfaction. Utilizing the Software Development Life Cycle (SDLC) methodology, existing systems were evaluated, and data was collected through interviews. A new system was developed and modeled using data flow diagrams, with implementation leveraging MySQL, PHP, HTML, CSS, and JavaScript due to their simplicity, open-source nature, and cross-platform support. The food ordering system was tested over two months with twenty T & K Eatery customers. This resulted in significant improvements: Customer Satisfaction increased from 60% to 95%, Speed of Service improved from 50% to 80%, and Order Accuracy rose from 55% to 93%. Additionally, the Average Order Completion Time was reduced by 46.7%, and the Error Rate decreased by 83.3%. These results, validated through statistical analysis, highlight the system's effectiveness in enhancing operational efficiency and customer satisfaction.

Keywords: *Food Ordering, Software Development Life Cycle (SDLC), My Structured Query Language (MYSQL), T & K Eatery, PHP.*

INTRODUCTION

Launching a new small business in today's competitive market is challenging, particularly against established players. Yang (2022) highlights that automating business processes, such as implementing an online ordering system, can provide a competitive edge. This system, suitable for the food delivery industry, addresses challenges posed by traditional methods, including reliance on paper-based menu cards and self-service technologies (Wiki1, 2024). Conventional systems often involve customers communicating orders to servers, who relay them to the kitchen. This process is prone to delays and results in unnecessary paper waste, as seen in T & K Eatery (Sridhar, 2022). Conversely, self-service systems allow customers to place orders via electronic devices, improving speed and minimizing errors (Ashish et al., 2024; Semblante et al., 2024). However, these systems can incur high installation and development costs.

Modern consumers prefer online ordering for its convenience and transparency, which simplifies interactions for both customers and restaurants. For example, customers can

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access an updated, user-friendly menu, select items, and review their orders in a cart before checkout (Jeetender et al., 2023). Once an order is placed, the system provides immediate confirmation, enabling efficient processing by restaurant staff and minimizing delays (Mudit et al., 2021).

Although the online ordering model is widely applicable (Wahid et al., 2024; Holocaine et al., 2020), its implementation via social media platforms like WhatsApp, currently used by T & K Eatery in Ughelli North, Delta State, has presented inefficiencies. These include long wait times, miscommunication, unmet customer preferences, and unfulfilled orders, leading to reduced customer satisfaction (Patel et al., 2021; Jeetender et al., 2023).

This study aims to resolve these challenges at T & K Eatery by developing and deploying an online food ordering application tailored for seamless meal ordering and delivery. Unlike existing systems, this solution will be designed specifically to address the inefficiencies identified in the eatery's current process, providing a tailored fit to its operational context.

To achieve this aim, the study will: review the existing restaurant food ordering system, gather information through interviews to identify specific user needs and evaluate outcomes, design a solution informed by the data gathered using a data flow diagram, develop a system aligned with user requirements and then deploy and test the system to ensure it resolves current inefficiencies and improves customer satisfaction.

This approach distinguishes itself by addressing the specific shortcomings of social media-based ordering systems while integrating features optimized for the eatery's unique operational demands, thus filling a research gap in the existing literature.

RELATED WORKS

Various studies have tried employing an online delivery system to ensure customer satisfaction but in T and K Eatery there has been consistent demand for an improved customer ordering and delivery process hence the study. The study by Semblante et al. (2024) highlights the rise of food delivery services in urban areas and the challenges faced, such as payment issues, food quality, and delivery delays. It identifies five content-related, two context-related, and four process-related factors from an analysis of 174 studies, calling for further research on app design, functionality, and operational models to improve food delivery.

Ashish (2024) explores the transformation of restaurants through online meal ordering, with themes like inclusivity, healthier options, and customer satisfaction. AI-driven solutions and personalized services are predicted to shape the future, emphasizing efficiency, diversity, and ethical considerations.

Kurniawan et al. (2024) investigate user satisfaction and intent to continue using online food delivery services in Indonesia post-COVID-19, finding showed that performance expectancy, habit, and online reviews drive usage. Wahid et al. (2024) similarly analyze consumer behavior, finding habits, meal quality, and satisfaction crucial for the reuse of online delivery platforms.

Vatambeti et al. (2023) conducted sentiment analysis on Twitter, finding Zomato had the most positive reviews compared to Swiggy and Uber Eats. Yang (2022) details the creation of an online food ordering system

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in China using Spring Cloud, aimed at improving service efficiency amidst pandemic-related lockdowns.

MATERIALS AND METHODS

The current system at T & K Eatery is entirely manual, requiring customers to enter the restaurant, wait in line, and verbally place their orders. Wait staff then record the orders, and customers must either wait near the counter or sit until their order is ready for pickup. These inefficiencies highlighted the need for a streamlined and improved ordering process. To address these challenges, the Software Development Life Cycle (SDLC) methodology was employed, and the system was modeled using a data flow diagram. Figure 1 illustrates the system's logical components, categorized into three primary parts which are the Web Ordering System. This component serves as the user-facing interface, enabling customers to place orders and submit necessary information seamlessly. Menu Management is the logical module that empowers the restaurant to manage its menu, determining what items customers can view and order while the Order Retrieval System helps the restaurant track all orders placed, facilitating efficient retrieval and presentation of order details.

The system supports a variety of functionalities for patrons, including creating and managing accounts, logging in, browsing the restaurant's menu, selecting items, and placing orders. Administrative Functions:

Certain functionalities are reserved exclusively for administrators, such as: Adding, updating, or deleting food categories and items from the menu. Updating prices for food items. And Modifying additional item details (e.g., descriptions, photos).

These administrative tasks are most critical during the system's initial setup and for periodic updates, as menu changes are generally infrequent and seasonal. The Agile SDLC Model guided the development process. This iterative and incremental approach emphasized collaboration with stakeholders, continuous feedback, and adaptability to evolving requirements.

The development phases included: Planning and Requirement Analysis: Identifying system objectives and user needs. Design: Structuring the system using data flow diagrams and planning its components. Implementation and Development: Building the system incrementally in short, iterative sprints. Testing: Ensuring system reliability and functionality at the end of each sprint and Deployment and Maintenance: Deploying the system for use, followed by periodic updates and troubleshooting.

This approach ensured that the system not only addressed the identified inefficiencies but also remained flexible to accommodate future improvements.

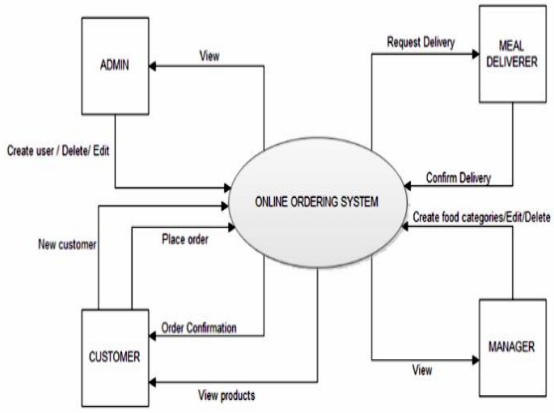

Figure 1: Food ordering data flow diagram.

SQLite was selected as the database, and the table structures and attributes were properly designed to actualize the study aim. The system's back end was created with Sqlite. An ISAM engine with a graphical user interf

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ace (phpMyAdmin) allowed for system access. The developed system has Admin, Payment, Products and Transactions sections. The system has a user table, register table, list menu table, category menu table, and List order table. Table 1 was created just for the restaurant's moral patrons. After completing the registration process, the customer will receive their username and password and can proceed with the order process. Bill is automatically directed to that specific use. This comprises consumer facts that make up the user's information, such as name, password, email, phone number, address, update, active, and identity. As shown in table 2.

Table 1: User table

Name	Type	Size	Description
User_id	Int	11	Auto-increment
User_name	Varchar	45	Null
User_password	Varchar	125	Null
User_group	Int	11	Null
User_full_name	Varchar	65	Null
User_email	Varchar	45	Null
User_phone	Varchar	16	Null
User_address	Text		Null
User_update	Tiestamp		Null
User_active	Int	11	Null

Table 2: Register table

Name	Type	Size	Description
Register_id	Int	11	Auto-increment
Register_email	Int	65	Null
Register_password	Varchar	45	Null
Register_name	Varcher	45	Null
Register_address	Varchar		Null
Register_street	Text		Null
Register_phone	Text		Null
Register_type	Varcher	20	Null
Register_Date	Varchar	25	Null
User_active	Timestamp		Null

In other to easily access the menu that has been ordered Table 3 was designed for this purpose.

Table 3: Menu Table

Name	Type	Size	Description
menu_id	Int	11	Auto-increment
menu_category_id	Int	11	Null
menu_password	Varchar	65	Null
menu_price	Double		Null
menu_disc	Float		Null
menu_image	Varchar	125	Null
menu_img	Varchar	80	Null
menu_desc	Text		Null

Table 4 presents a straightforward List Order table, primarily intended for use by restaurant staff. It displays a list of ordered menu items in the simplest format. Similarly, Table 5 is designed for administrators to view food categories in a list format. This table features four buttons in the upper right corner: Insert, Update, Delete, and Link. Clicking the "Insert category" button directs the user to an interface where they can add new dishes by creating a new category.

Table 4: List order table

Name	Type	Size	Description
Order_line_id	Int	11	Auto-increment
Order_line_header_ref	Varchar	15	Null
Order_line_menu_id	Int	11	Null
Order_line_category_name	Varcher	45	Null
Order_line_name	Varchar	45	Null
Order_line_image	Varchar	65	Null
Order_line_price	Double		Null
Order_line_disc	Float		Null
Order_line_qty	Int		Null
Order_line_subtotal	Double		Null
Order_line_date	Timestap		Null

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Table 5: Category Menu Table

Name	Type	Size	Description
category_id	Int	11	Auto-increment
category_name	Varchar	45	Null
category_image	Varchar	120	Null
category_img	Varchar	80	Null
category_desc	Text		Null

Twenty (20) customers were interviewed using a questionnaire to evaluate their satisfaction with the new system using a 5-point Likert scale, where 1 = Very Unsatisfied, 2 = Unsatisfied, 3 = Neutral, 4 = Satisfied, and 5 = Very Satisfied. Measures such as mean, median, standard deviation, and frequency distribution were employed for analysis.

Statistical hypothesis testing was conducted to assess the impact of the new system on customer satisfaction. The null hypothesis (H_0) stated that the new system has no significant impact on customer satisfaction, while the alternative hypothesis (H_1) asserted that the system significantly improves customer satisfaction. The mean satisfaction score was compared to a neutral score of $\mu = 3$ to determine the outcome.

RESULTS AND DISCUSSION

The following table structure front end was designed to link the design database. Figure 2. Creates an opportunity for users with already existing accounts to log in.

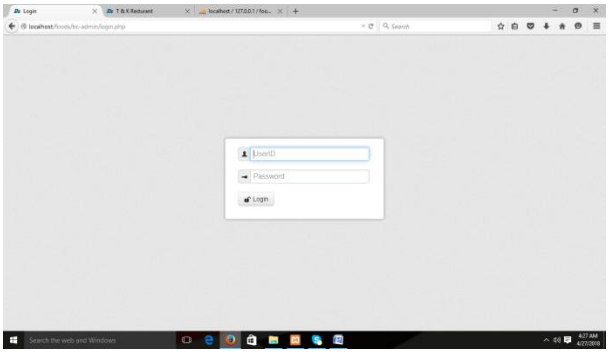

Figure 2: Login Page

Figure 3 is the home page this welcome screen allows the user to order the food they want and view all of the food that is offered in the stuck.

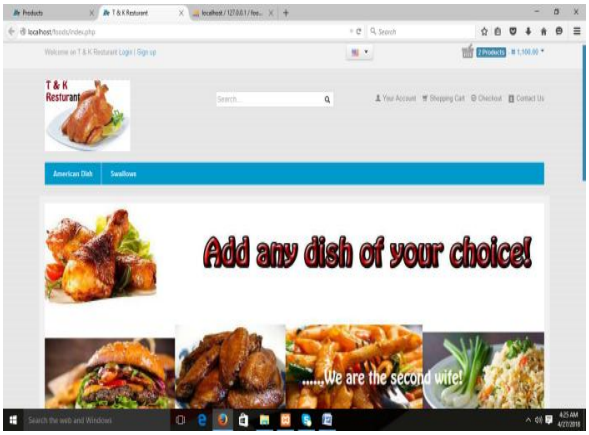

Figure 3: Home Page

The culinary categories are displayed on the categories page, such as American dishes like pap. Figure 4 shows pastries, snacks, and swallows.

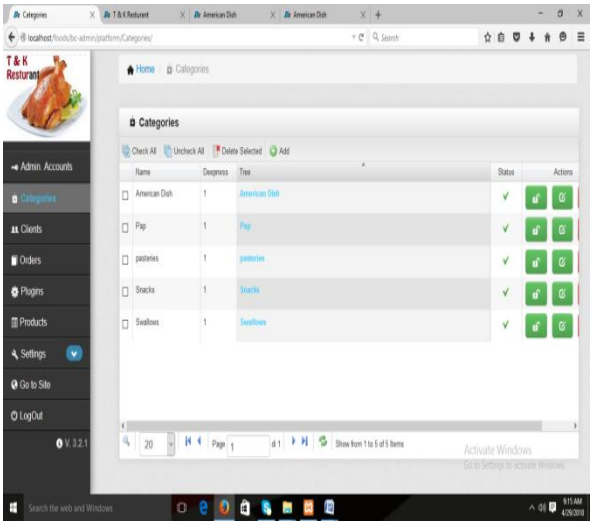

Figure 4: Categories Page

Figure 5 is the product page; the product page allows users to place food orders and displays all of the food that has been ordered.

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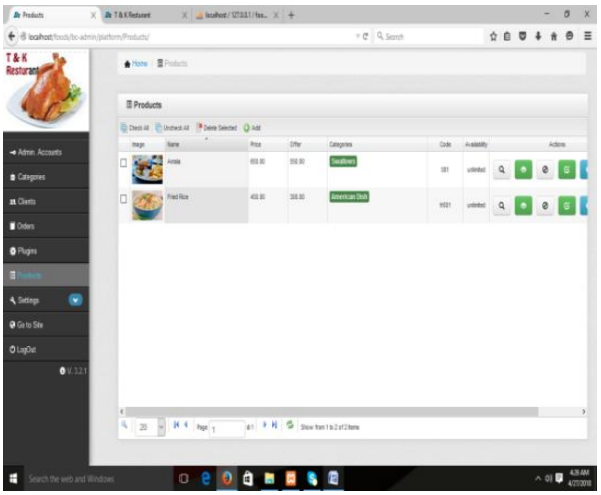

Figure 5: Product Page

After the system was developed, twenty (20) customers were asked to rate the performance of the system using metrics such as Ease of Use, Order Accuracy, Speed of Service, Customer Satisfaction, and Overall Experience metrics on a Likert scale from 1 (Very Unsatisfied) to 5 (Very satisfied). feedback data were analyzed using descriptive statistics, including mean scores, standard deviations, and percentage distributions. the frequency in percentage obtained in this rating is shown in Table 6 while the system's performance metrics (e.g., order completion time, errors) were also assessed as shown in Table 7.

Table 6: Percentage Frequency Obtained in the Rating from Customers

Rating	Frequency	Percentage (%)
5 (Very Satisfied)	8	40%
4 (Satisfied)	9	45%
3 (Neutral)	3	15%
2 (Unsatisfied)	0	0%
1 (Very Unsatisfied)	0	0%

The implementation of the online food ordering system at T & K Eatery yielded remarkable improvements across key performance metrics, as summarized in Table 8. The Speed of Service improved significantly from 50% to 80%, while Customer Satisfaction increased from 60% to 95%. Order Accuracy was enhanced from 55% to 93%, and the Overall Experience showed a significant boost, rising from 58% to 92%.

Table 7: Results Obtained from the Different Descriptive Statistics

Parameter	Mean Score	Standard Deviation	Percentage of Excellent Ratings (5)
Ease of Use	4.8	0.4	90%
Order Accuracy	4.7	0.5	93%
Speed of Service	4.6	0.6	80%
Customer Satisfaction	4.9	0.3	95%
Overall Experience	4.8	0.4	92%

In terms of operational performance, the Average Order Completion Time decreased from 15 minutes before implementation to 8 minutes after implementation, representing a 46.7% reduction in completion time. Additionally, the Error Rate in Orders experienced a substantial decline, dropping from 12% before implementation to 2% after implementation. an 83.3% reduction in errors.

These improvements were statistically validated through rigorous analysis. A t-test comparing customer satisfaction scores before and after implementation revealed a significant enhancement, with $t = 6.47$, $p < 0.01$. Furthermore, a chi-square test assessing the frequency of errors in orders confirmed a significant reduction, with $\chi^2 = 9.78$, $p < 0.05$. These results underscore the effectiveness of the developed system in optimizing operational efficiency and significantly enhancing customer satisfaction at T & K Eatery.

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Table 8: Comparative Analysis Before and After System was Implemented

Parameter	Before Implementation	After Implementation
Speed of Service	50%	80%
Customer Satisfaction	60%	95%
Order Accuracy	55%	93%
Overall Experience	58%	92%

Graphical illustration for the results obtained for the Comparison of Metric Before and After System Implementation is as shown in Figure 6.

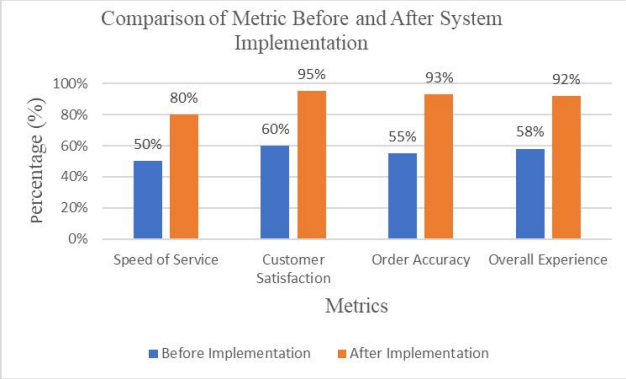

Figure 6: Comparison of Metric Before and After System Implementation

CONCLUSION

The online food ordering system for T & K Eatery in Ughelli North, Delta State, was developed to improve management efficiency and simplify customer interactions across various platforms. The system allows the business to manage dishes and orders efficiently while enabling customers to view and order dishes through a public webpage over a desktop/laptop or any mobile device.

Key achievements include the implementati on of core functionalities and a responsive design compatible with all screen sizes. The paper followed the agile development process, analyzing existing challenges and opportunities, which informed the system's design and functionality.

Future Work

Future improvements could include features for financial reporting (daily, weekly, and annual earnings), staff recruitment integration, comprehensive staff records, and customer order tracking to identify the handler. These enhancements would further optimize operations and provide valuable insights for management.

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