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REPEAT ORDER RECOMMENDATION MODEL TO DIGITALIZE THE CANTEEN

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Abstract

The canteen is a campus facility that the academic community needs. However, because it is considered a complementary facility, business processes in the canteen are carried out conventionally, relying on paper-based recording. In addition, at certain hours, especially at lunchtime, the canteen is overloaded due to too many orders co-occurring. This buildup of charges is due to the need for canteen preparation in preparing orders from its buyers. Therefore, this study developed an ordering system to recommend the menus that customers likely purchase. The case study used in this research is the Keluwih canteen on the Tenggilis campus, owned by the University of Surabaya. This research used the waterfall method and focused on three main canteen processes: online ordering with a repeat order recommendation model for sellers, delivery services, and payments using the e-wallet. The study's results were assessed qualitatively, and the respondents felt they got better and faster service. Furthermore, with this system's e-canteen application, the time needed to complete a transaction at the campus canteen can be done efficiently to increase customer satisfaction and employee productivity from tenants.

Keywords: *Digitization; E-canteen; Mobile; University of Surabaya*

Introduction

Digitizing business processes is critical for improving service quality(Rombe, 2020). Technology can help human life, from complicated things to simple things, such as going to the doctor(Ramadhan & Pradekso, 2020), shopping(Liliana et al., 2020), or buying food quickly(Azzuhri et al., 2018). This condition is in line with the characteristics of the digital generation, which is "bound" to technology(Dangmei & Singh, 2016), mobile-minded(Shatto & Erwin, 2016; Smith, 2019), and requires speed access for all their needs(Cilliers, 2017; Taipale, 2016). The digital generation is a generation that is exposed to technology from an early age(Priporas et al., 2017), with a current age range of 15 to 40 years. Some of them are in school or college. One of the facilities considered necessary for lectures is the canteen(Randita et al., 2019).

The canteen is a facility that provides food and drinks for the academic community(Solikin, 2019). In Indonesia, most canteen operations are carried out conventionally, where customers come, queue, officers take orders, and receive

orders(Nugroho et al., 2019; Purnama et al., 2020). The cafeteria on campus tends to be crowded at lunchtime or during class changes. This can cause a relatively high human error from the canteen staff(Neyfa & Tamara, 2016). The queues sometimes make students skip lunch because they need help to buy food(Fonggo et al., 2020) or purchase food outside the campus(Mufidah, 2020). In addition, there are times when students need more time to go to the canteen to eat because college assignments should be done during break time(Calista et al., 2022). With this conventional system, the tenant management in the canteen needs help tracking sales data(Neyfa & Tamara, 2016), as well as the payment process, which often requires much change(Dermawan & Masya, 2020).

Based on the findings above, it was found that there is a root cause of the current condition, namely the ineffectiveness of the food supply process by sellers in the canteen, and the inefficient payment system that still uses conventional. Therefore, a computerized information system is needed for the canteen, with the aim of helping the business processes in it. Digital technology is an opportunity to provide alternative solutions to existing problems. The canteen digitization process was carried out within the scope of food ordering research(Nugroho et al., 2019) which is complemented by the method of recommending repeat orders, delivery services(Andri et al., 2019), and digital payments(Gunawan et al., 2019; Syahril & Rikumahu, 2019), with a case study of the Tenggilis campus canteen, University of Surabaya. The recommendation method used is to analyze comments from customers on the menus that had been ordered and combine them with the history of transactions carried out by these customers(Chen et al., 2016; Wu et al., 2022). Withthis application, student needs related to easy access to orders, payments, and fulfillment of food and beverage orders in the canteen could be done quickly and help tenants in the time efficiency required for each transaction.

Research Methods

This research was conducted according to the Software Development Life Cycle theory, using iterative methods(Heeagera & Nielsen, 2018) and agile(Alejandro et al., 2019). The limited resources of time and staffing became the basis for choosing the two methods(Heeagera & Nielsen, 2018) because the research was conducted during a pandemic(Masrul, Leon A. Abdillah, Tasnim, Janner Simarmata, Daud Oris Krianto Sulaiman, Cahyo Prianto, Muhammad Iqbal Agung Purnomo, Febrianty, 2020). The research flow was carried out in stages (1) literature study, (2) analysis, (3) design, (4) implementation, and (5) trial, which was adjusted to the needs of the field.

A literature study collected various studies related to this research topic. The literature study focuses on searching for journals through the Google Scholar platform, with a 2016-2022 publication filter and the keywords 'canteen information system', 'e-canteen', 'canteen digitization', and 'canteen digitalization'. In addition, a search for publications related to the digital generation and the 4.0 industrial revolution was also carried out in the same period.

The current condition analysis phase was carried out through interviews with canteen administrators and tenant owners and questionnaires to students and campus staff as users of canteen services. After that, they were benchmarking was carried out against similar systems. The results of the analysis phase are in the form of detailed system requirements. This system requirement was used for data design(Dybka, 2020), process design(Recker, 2008), and interface design.

The implementation process uses the PHP programming language equipped with several libraries and a MySQL database. First, the research team tested applications made

independently to ensure the system was free from errors. After that, the trial continued with the black box testing method(Nidhra, 2012). The relevant users were asked to use the system and answer questions about their experience using it.

Results and Discussion

The analysis phase was carried out through interviews with canteen administrators and tenant owners and by distributing questionnaires to students and campus staff as users of canteen facilities. In the questionnaire results, 85% of respondents stated that the canteen needed a system improvement. Furthermore, it was found that the main problems faced by the canteen at the Tenggilis campus, University of Surabaya, where the queues at certain times were very high, such as lunch hours or class changes, and the queue order needed to be clarified. This central problem gives rise to other issues, such as:

1. Some consumers choose to avoid buying food in the canteen when they see a long queue. The alternatives they do are buying lunch before the time, delaying lunch, or buying food from outside the campus.
2. Some consumers choose tenants based on the number of short queues, regardless of their food/beverage preferences.
3. Some consumers need to bring the correct money when making transactions. In addition, most users, both from the consumer side and the landowners prefer payment using e-money because it is considered more practical and secure.
4. Due to the paper-based system or a simple cash register used by tenants, the level of human error is high, including giving the wrong order, doing the wrong order, and needing help to provide the correct change.
5. In connection with the pandemic, a new need arose to facilitate consumers with a dining reservation system for those who dine in. As a result, consumers were given 30 minutes to occupy the place to eat that had been ordered.

Based on the problems found from the analysis, it was concluded that the application could help solve them. The system features that would be made include (1) ordering food/beverages online, where consumers can choose pick-up/delivery times from their orders, (2) a rating feature that can help consumers choose food/drinks according to their wishes by providing food recommendations, (3) payment using a payment gateway to facilitate the payment process, (4) dining reservation feature and (5) adjustment of the four main features into a business process flow that can assist tenants in managing queues.

The next stage was done by making data design and process design. The data design was created using the crowd's foot diagram method using the MySQL Workbench application. At the same time, the process design uses the Business Process Modeling Notation (BPMN) method via the bpmn.io web.

The design data can be seen in Figure 1. The recorded data includes consumer input to the shopping cart, where consumers can input several menus from different tenants. When a consumer places an order, the data in the shopping cart will move to the order. Orders can be made in the future, for example, at 8 am to order fried rice to be picked up at 11 pm. Every change in order status will be recorded in the Log table to make monitoring the order status easier for all users.

When placing an order, consumers can see the tenant’s workload based on the status of other orders received and food recommendations from the system. So, from the suggestions, consumers can choose food faster, and from the seller's point of view, they

can also prepare food better. This is because buyers can see predictions of repeat orders from customers through food recommendations to these customers. Each tenant has a maximum number of active orders that can be accepted. If the maximum number of orders has been reached, the consumer cannot order from the tenant.

Consumers must input their location if they ask for a delivery service. There are two location options, namely, on or off campus. Places on campus were grouped by faculty and the closest campus space to students. The consumer must enter an address or select a point on the map if the site is outside the campus.

Two types of couriers for delivery services are owned by the tenants or using Onthel services(Andre, 2020). The tenants determined shipping costs for couriers from tenants based on the shipping distance or fixed price. Meanwhile, using Onthel's services automatically takes the number of shipping costs from the Onthel application.

Recording the rating is essential in this system because it was used as customer feedback data. This rating could be grouped into several assessments, for example, food quality/quantity rating, tenant service quality, or service quality in general. Consumers are free to fill in the rating as they wish. This rating will be used as processed data to provide consumers with food/beverage/tenant recommendations.

According to the payment gateway companies that work together, payments can be made through various types of payments. Therefore, officers at the tenant can choose the type of payment made by the consumer, and at the end of the day, they can disburse funds independently to each payment gateway that works together.

Especially for consumers who choose to eat on the spot, a dining reservation feature was provided. On every order with dine-in status, consumers can be directly directed to select a place to eat. Each dining area had been labeled, and the capacity was regulated. Consumers have the right to occupy this dining area for only 30 minutes, and during that time, the status of the dining area was settled. After 30 minutes, the place will change to available so that other consumers can choose again.

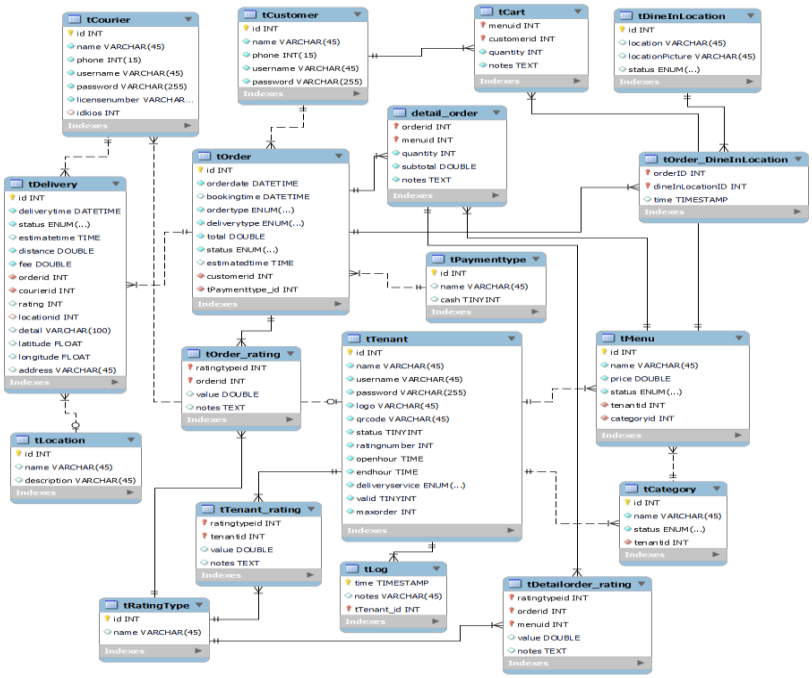

Figure 1. Data Design

The flow of the ordering process can be seen in Figure 2. In this BPMN, the flow for ordering food online was described. Consumers can search for menus based on several criteria, for example, the most purchased menu, the menu with the best rating, favorite tenants, less crowded tenants, types of food, and other categories.

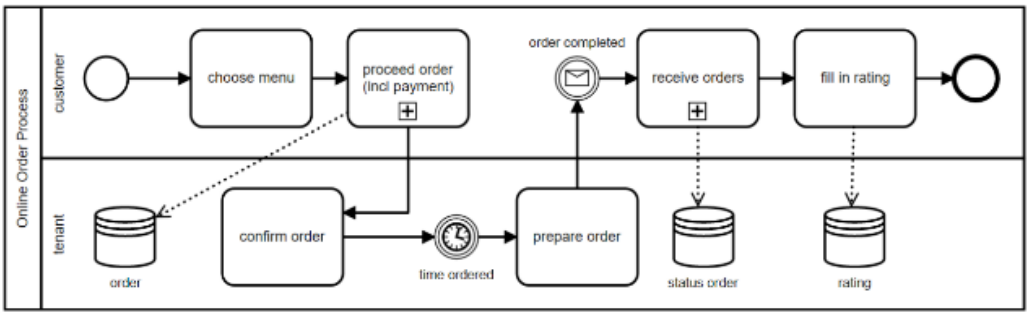

Figure 2. Process Design

If the consumer is sure of his choice, he can continue the order by inputting the necessary order data, such as how to take orders, time to take orders, payment methods, and locations. Payment for online orders must be made in advance, using the type of payment provided (non-cash only).

Tenants can confirm the order by accepting or rejecting it. If he refuses, the funds will be returned to the consumer's e-money. Furthermore, if he takes it, he will work on the order according to the booking time the consumer chooses.

When the order is ready, the tenant can change the status, and the customer gets a confirmation. Consumers receive orders according to the method chosen at the beginning of the transaction. If the consumer decides to pick it up, he must come to the tenant's location and take the order. If the consumer chooses to deliver, he can monitor the status of the courier through the application. After receiving the order, consumers can input the rating value according to their wishes (at least one type of assessment). An example of a form for ordering menus, selecting times, inputting locations, and giving ratings can be seen in Figure 3.

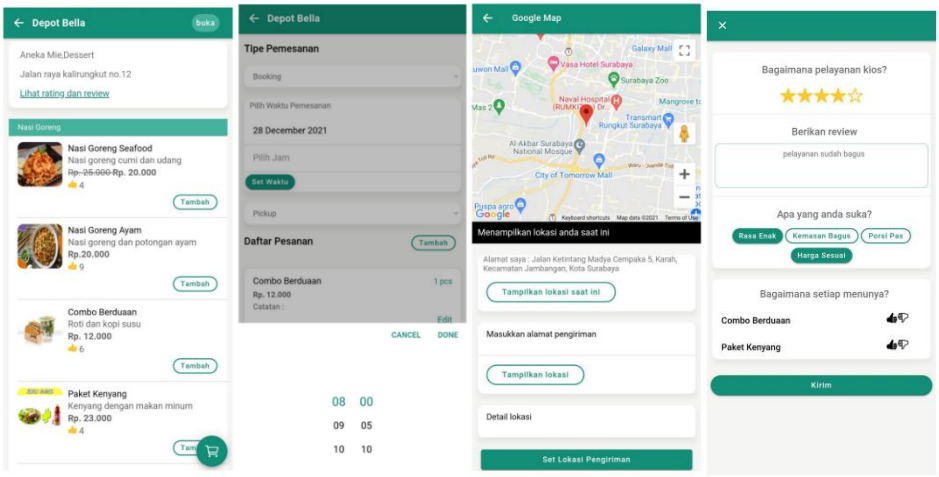

Figure 3. Online Order

The trial was carried out in two parts: verification and validation. First, the research team conducted the verification process to ensure the system was error-free. The validation process is carried out on end users, using the black box method, to ensure that the system is running following the business processes designed at the beginning of the study. The end users involved in the validation process are tenants and consumers.

The validation process was conducted remotely because the research was born during a pandemic(Masrul, Leon A. Abdillah, Tasnim, Janner Simarmata, Daud Oris Krianto Sulaiman, Cahyo Prianto, Muhammad Iqbal Agung Purnomo, Febrianty, 2020). The Maze application(Maze, 2020)assisted this validation process, as seen in Figure 4. Through this application, consumers were asked to provide several commands to the system in the form of a prototype. The orders include selecting a menu, placing an order, or giving a rating. Consumer assessment of the system was carried out qualitatively, where 80% of consumers state that it helps them order food in the canteen. The processes that were considered to have allowed them include more accessible menu selection due to ratings and recommendations, efficiency in collecting time regarding booking features, cashless payments, and delivery services.

Figure 4. User Testing

From the tenant side, trials were also carried out using the Maze platform. The orders given include the addition of a new menu, confirming newly received orders, and making sales reports on certain days. Qualitatively, tenants stated that the system could assist them in processing orders received and better understanding the menu preferences of customers. In addition, the existence of payments using e-money made at the beginning of the transaction prevents them from being miscalculated and the risk of orders not being taken. However, criticisms conveyed by tenants are worried about the smooth signal in the canteen area and the ability of employees in the field to operate the application.

Conclusion and Recommendation

This research aims to digitize the business processes that occur in the canteen, to help consumers choose, order and pay for their orders more efficiently. In addition, the system is also expected to allow tenants to receive orders and payments. Based on the results of implementation and trials that had been carried out, the e-canteen application can be a means to make it easier for customers to place orders and make it easier for sellers to serve customers more effectively. Furthermore, through this e-canteen application, the digitization process of ordering, payment, and service between restaurant orders can be made relatively quickly compared to conventional business flows. Thus, consumer satisfaction with campus canteen services increases, and the productivity of tenant employees increases.

The limitation of this research is that there needs to be identification of the end user's ability level for similar applications. This should be done to ensure system-level acceptance because not all end users from the tenant side have a good level of education. In addition, the experiment was carried out with all the limitations of the researcher's movement due to the pandemic condition, which did not allow physical meetings with all end users.

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