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Implementing gamification in campus canteen using MDA framework: an overview

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ABSTRACT

This study describes the creation of a mobile-based gamification design for an online canteen system. Long lunch queues make students feel uncomfortable ordering food in the canteen, although student comfort is very important. The increasing number of students causes long queues, resulting in significantly shorter lunch hours and causing discomfort for students. To address this issue, the campus might develop an online canteen using gamification. Gamification is a method that applies gaming knowledge to create experiences that encourage and engage people in non-game environment. Compared to traditional canteen systems, an online canteen that uses gamification can provide students with new experiences by offering attractive rewards, increasing motivation to order food and beverages online, and minimizing the perception of long lineups. Although this proposed design has not yet been tested, researchers believe it has practical applications.

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1. INTRODUCTION

In recent years, there has been an increase in the number of students, which causes the canteen to grow busy, especially during lunchtime [1]. Limited time to place an order, no opportunity to study the meal menu [2], long lines and the inability to place a meal might reduce lunch time to the point that students grumble about the efficiency of cafeteria operations and grow uncomfortable purchasing food. The canteen serves meals and drinks. To alleviate the stress of purchasing food and drinks in the canteen, the use of information technology can be used to promote food and drink purchases [1]. Students can order and purchase food ahead of time using information technology, which reduces wait times in the canteen. Gamification is one type of technology that can be applied. Gamification refers to the application of game design ideas to non-gaming circumstances [3]. Gamification can involve users in solving problems in non-game circumstances by merging items that have value with game dynamics to improve user interest [4]. Gamification is based on and linked to several theories, including communication, human psychology, motivation, learning and development, behavioural economics, problem solving, teamwork, decision making, and risk taking [5]. Gamification is intended to make ordering meals more convenient and enjoyable for students [6], reducing the pressure to buy food straight from the canteen. In the context of prior studies that used information technology to boost the simplicity of ordering meals in the cafeteria, researchers discovered that the use of information technology can simplify the payment and ordering procedure in the canteen [7], [8],

helping to lower the energy intake required for ordering in the canteen [2]. Increasing student participation in ordering food in the canteen and improving the service provided [9]. However, further research revealed that a gamification approach to ordering meals in online canteens is still infrequently used. As a result, the goal of this study is to create a design for incorporating gamification into the canteen. According to Sjoberg [6], the gamification aspect in the program has been demonstrated to improve student attendance in the canteen and create contact amongst fellow students. As a result, the purpose of this research is to address the issue of lengthy waits and a lack of rest time by creating a gamification-based online system design for the campus canteen to create a more pleasant and fascinating environment [6] and decrease the time spent queuing.

2. LITERATURE REVIEW

In this study, the literature review focuses on gamification and campus canteens.

2.1. Gamification

Gamification has recently developed as a popular trend in the business and marketing industries. Gamification is currently being used in a variety of disciplines, including education, information studies, human-computer interaction, and healthcare [10]. Gamification began in 2008 [11], but only gained broad notice in non-game circumstances in 2010 [12]. According to Werbach and Hunter [13], gamification is the practice of game thinking, which includes the process of designing products, services, and systems by game designers using human psychology. Meanwhile, Deterding [11] defines "gamification" as the application of game design components in a non-game setting using reward and reputation system software services with points, badges, levels, and leader boards. Houtari and Hamari [14] also provide an opinion regarding the definition of gamification as a type of service packaging in which core services are enhanced with a rule-based service system that provides feedback and interaction mechanisms to users with the goal of facilitating and supporting overall user value creation. Gamification comprises three basic principles: mechanics, dynamics, and emotion (MDE) [3]. Gamification is used to motivate and involve users by utilizing game aspects and procedures [10] to drive is used to motivate and involve users by utilizing game aspects and procedures [13].

2.2. Campus canteen

School provides an ideal environment for aligning and integrating curricula, nutritional principles, and food service [15]. The school setting is an important aspect of the social environment that impacts eating behaviour, especially when food preferences are learned through regular exposure to food [16] where at least one primary meal will be consumed [17]. The canteen is a venue placed on campus which attempts to give food services to the campus community for a specific charge [18]. According to Ardzejewska *et al.* [19], the canteen is a location to provide healthy food and drinks to students and has the capacity to supply meals that may be difficult to get. The canteen is the primary location for students to purchase food and beverages [18]. Typically, the easier it is to access the canteen, the more students will consume food and drinks [17]. Campus canteens can be managed by the school or outsourcing corporations [20]. Canteens typically sell food and beverages in specific sizes (one portion) for consumption [17].

3. METHOD

The mechanics, dynamics, and aesthetics (MDA) model is utilized as the decision-making framework in this research. Robin Hunicke proposed the MDA model to describe how game systems interact with players, comprising mechanics, dynamics, and aesthetics [21]. This framework was selected due to its prevalence as a design architecture model in gamification for both game and application development [4]. According to Hunicke *et al.* [22], the MDA framework offers a structured approach to understanding games. The MDA model can be viewed as a formal approach to comprehending the gamification process, as it delineates the game design process, critiques games, and conducts technical game research [23]. Gamification design introduces a new method of learning, addresses users' psychological needs, and holds unique value [4]. An essential aspect of constructing an effective gamification system involves understanding the elements that drive player motivation [24]. The MDA model includes three components: mechanics, dynamics, and aesthetics, as depicted in Figure 1.

Researchers can take into account the design process aligned with the model and develop a proper understanding of the game, offering a framework and effective analytical guidance by integrating both figurative and abstract levels into the creation of game components. Within the MDA model, each aspect of the design process should be thoroughly elucidated as the following subsection [4].

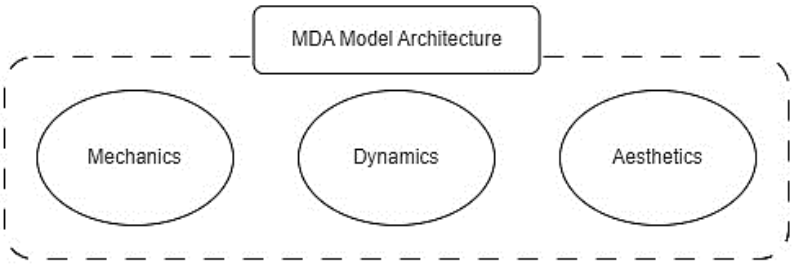

Figure 1. MDA framework

3.1. Mechanics

Mechanics act as both constraints and guides in interaction design. They encompass operational specifications that define acceptable user interaction behaviors and influence the direction of the gameplay process [4]. According to Robson *et al.* [3], mechanics involve decisions made by designers regarding scenarios that set objectives, rules, environments, contexts, types of interactions (such as opponents), and game constraints. Limantara *et al.* [25] defines mechanics as the use and presentation of game element. This study focuses on two types of mechanisms: i) regulatory mechanisms, where students engage in the game individually; and ii) rule mechanism, which establish the desired concept or goal of the gamified experience. In this research, rules dictate that user points will reset weekly to alleviate pressure on other users and foster competition among participants. Additionally, players can unlock more rewards as they accumulate more points.

The development of mechanics encompasses different types of tools used by designers to shape the user experience. This study employs leaderboards and point accumulation to track user advancement. Users can also receive tangible rewards by exchanging points they have gathered for incentives [3].

3.2. Dynamics

According to Robson *et al.* [3], gamification dynamics refer to the behaviors exhibited by players as they engage in the experience. On the other hand, Limantara *et al.* [25] define game dynamics as various applications of game mechanics that structure gamification into rules with significant impact. Dynamics dictate gameplay behaviors, strategic moves, and interactions throughout the experience [3]. Wang and Luo [4] suggest that diverse interaction types can lead to varying aesthetic experiences.

In this study, dynamics involve all users purchasing food and drinks through the system and then completing payments. Upon completing the payment process, each user receives points based on their purchases. Accumulated points can be exchanged for rewards, and the total points are displayed on a leaderboard. Incorporating user interactions can enhance user engagement with the application and stimulate its adoption and development among users [4].

3.3. Aesthetics

Robson *et al.* [3] defines aesthetics as the representation of desired emotional responses (such as fantasy, conquest, fellowship, and discovery) that emerge within players as they interact with the game. Meanwhile, according to Wang and Luo [4], aesthetics are the perceived aesthetic values during the experience process, achieved through mechanical and dynamic arrangements, as well as the best game experience provided (i.e., sensory and emotional experiences) to achieve the desired final goal. There are eight aspects of aesthetics in gamification: sensation, fantasy, narrative, challenge, fellowship, discovery, expression, and submission. Challenge is a commonly used gamification aesthetic in implementation, where users must complete a task to earn point [25]. In this study, aesthetics will be accumulated after users finish paying for food and drinks and receive points.

4. RESULT AND DISCUSSION

4.1. Games rules

A game's rules immerse players in an artificial struggle to generate something measurable. The rules of the game are extremely crucial to follow because they establish the game mechanics [5]. In this study, the premise is that users will get points when they buy food and drinks, and the points they earn can be traded for incentives based on the quantity of points they have. In addition, points will be reset weekly.

4.2. Gameplay flowchart

Following the creation of the game rules, the game design must be prepared. Gameplay is a system that operates a game [5] in which university students participate as players. Figure 2 depicts the gameplay flow, which is detailed below.

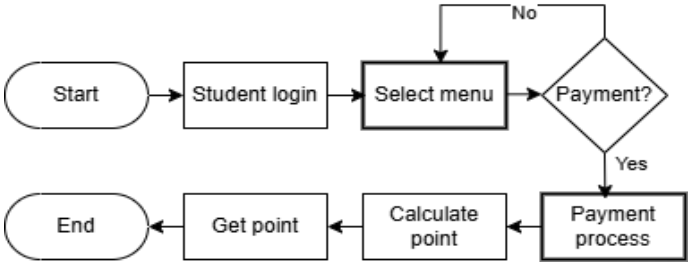

Figure 2. Gameplay flow

4.3. User interface prototype

In this section, the researcher will exhibit a prototype of the proposed system's user interface (UI), based on the previously demonstrated gameplay flow. The UI is an application display page that allows you to set and manage user roles as well as application security mechanisms. Starting with the user, they can enter the system by providing their Student ID and password as terms and conditions. The UI for entering the system can be seen in Figure 3.

After logging in, the user will see the home page, which includes the user profile and total points. Users can order from three categories: food, drinks, and snacks. In each category, consumers can order from a variety of menu items. The user interface of home page can be seen in Figure 4.

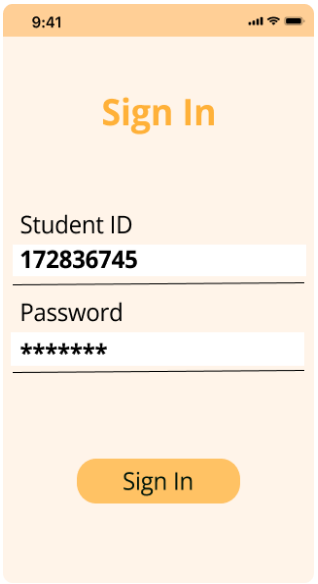

Figure 3. Sign in page

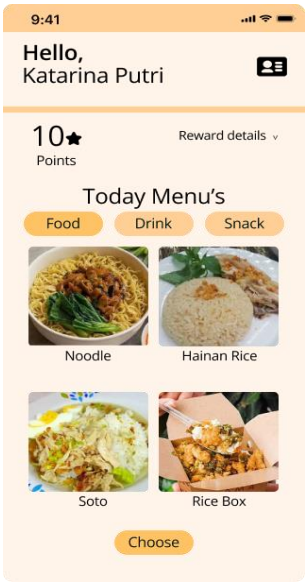

Figure 4. Home page

When the user has decided on the menu to order, they will be sent to the payment information page. This page will show the order details, the sum to be paid, and the total points received by the user. Users can also enter vouchers that can be converted into Points. The user interface of payment information page can be seen in Figure 5.

Points earned by users can be exchanged on the Rewards page. On this website, customers can exchange their acquired points for a variety of tempting vouchers. The rewards will be changed every week. The user interface of reward page can be seen in Figure 6.

The leaderboards page can be reached via the prize information page. On this page, users can view their own ranking as well as the ranks of other top users. This rating will be updated weekly. The user interface of leaderoards page can be seen in Figure 7.

Figure 5. Payment page

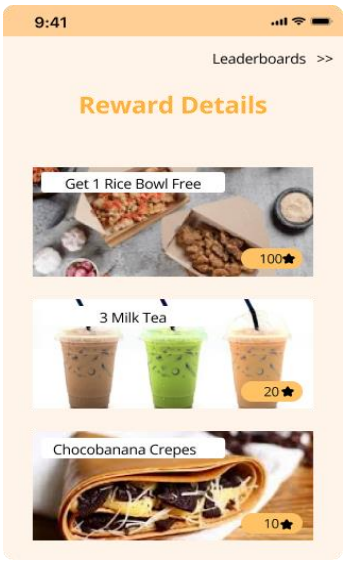

Figure 6. Reward page

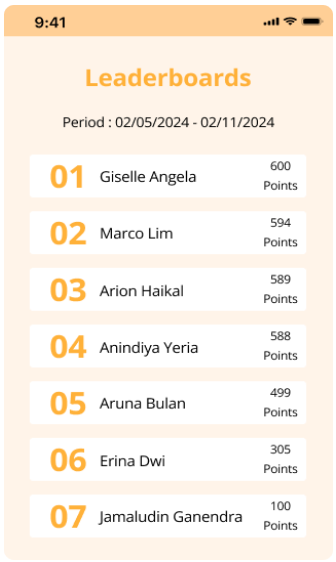

Figure 7. Leaderboard page

5. CONCLUSION

This study investigates the impact of increased student numbers causing the cafeteria to become busy and affect the emotional state of students, particularly during lunchtime purchases. While previous research on gamification in online cafeterias is limited, researchers believe that implementing gamification can make students feel more comfortable when ordering food and extend lunchtime, allowing for a longer lunch break. Researchers anticipate that implementing gamification will make food ordering more enjoyable while still providing economic rewards. The change in student attitudes due to gamification is expected to influence students' interest in purchasing cafeteria food, prolonging lunchtime, and ultimately building comfort in using and interacting with the gamified system. To maintain competitive advantage, companies must adopt new research technologies. Incorporating gamification into the cafeteria system is expected to open several organizational growth prospects. This study attempts to develop cafeteria design by incorporating gamification using the MDA approach. The study focuses on exploring gamification design development for implementation in online cafeterias to enhance student interest and positive feelings when purchasing cafeteria items. However, further and deeper studies may be necessary to ensure that the gamification design development conducted can help achieve desired goals, especially regarding student interest and positive feelings when purchasing cafeteria items. Future research could further explore issues in the cafeteria so that gamification design can be developed more diversely in a suitable manner to generate positive and enjoyable feelings perceived by users.

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