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Optimizing Space Comfort Through User Behaviour-Based Food Court Redesign

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ABSTRACT

Food court is a supporting facilities on campus that serves students' dining needs while also fostering social interaction. In addition to being a place to eat, food court also serves as a space for students and the academic community to gather, discuss, interact, and rest. However, the current condition of Medan Area University Food Court still faces several issues, such as ineffective layout, suboptimal comfort levels, disorganized user flow, and design that fails to fully accommodate users' needs. These issues result in a space that fails to adequately support the activities there. This study aims to redesign the Medan Area University Food Court based on analysis of user behavior and needs to create a more functional and comfortable space, with the hypothesis that redesign based on this analysis will improve the quality of the space in terms of thermal, visual, and social comfort. The method used was a qualitative method with descriptive approach to understand activity patterns, social interactions, and user behavior. The results of this study produced design concept that optimizes the quality of the space, so the food court can function more effectively as a facility supporting campus activities.

Keywords: Food court; qualitative; redesign; user behavior; user needs

ABSTRAK

Food court merupakan salah satu fasilitas penunjang di lingkungan kampus yang berfungsi untuk memenuhi kebutuhan konsumsi sekaligus mendukung aktivitas sosial pengguna. Selain sebagai wadah untuk makan, *food court* juga menjadi ruang berkumpul, berdiskusi, berinteraksi, dan beristirahat bagi mahasiswa serta civitas akademika. Namun, kondisi *Food Court* Universitas Medan Area saat ini masih menghadapi beberapa permasalahan, seperti tata ruang yang kurang efektif, tingkat kenyamanan yang belum optimal, sirkulasi pengguna yang belum teratur, serta desain ruang yang belum mampu mengakomodasi kebutuhan pengguna secara maksimal. Permasalahan tersebut menyebabkan kualitas ruang kurang mendukung aktivitas yang berlangsung. Penelitian ini bertujuan untuk meredesain *Food Court* Universitas Medan Area berdasarkan analisis perilaku dan kebutuhan pengguna guna menciptakan ruang yang lebih fungsional dan nyaman, dengan hipotesis bahwa redesain berbasis analisis tersebut akan menghasilkan peningkatan kualitas ruang dari aspek kenyamanan termal, visual, dan sosial. Metode yang digunakan adalah metode kualitatif dengan pendekatan deskriptif untuk memahami pola aktivitas, interaksi sosial, dan perilaku pengguna. Hasil penelitian ini menghasilkan konsep desain yang telah mengoptimalkan kualitas ruang sehingga *food court* dapat berfungsi lebih optimal sebagai fasilitas pendukung aktivitas kampus.

Kata kunci: Food court; kebutuhan pengguna; kualitatif; perilaku pengguna; redesain



Introduction

Public facilities provided on campus play a significant role in supporting both academic and non-academic activities around the university. One facility frequently used by students, faculty, staff, and visitors is the campus food court. A food court is an area with several stalls offering both food and beverages, all located in one place (Zian Nibrasya et al., 2023). Generally, food courts serve as supporting facilities to meet users' consumption needs. Furthermore, food courts also serve as spaces where users can rest and engage in various interactions (Dhanny, 2019). Within the university grounds, they can also serve as discussion venues, thus becoming informal learning areas. Medan Area University, one of the campuses in Medan, continues to develop its facilities to support user activities, particularly for education. One of these facilities is the food court, the most actively used public area, whose functions directly impact user activities. Meanwhile, (Nafis, 2023) states that the design of a food court significantly impacts user comfort, productivity, and behavior. Based on initial observations of the Medan Area University food court, problems related to circulation and ventilation were still identified. The area often becomes overcrowded during lunchtime, creating inefficient and irregular circulation patterns due to the inadequate arrangement of food court elements such as stalls, tables, and chairs. Furthermore, during these times, it can feel extremely hot due to suboptimal ventilation. Consequently, these conditions can hinder user activity and reduce comfort.

According to (Zaqia Yuliana Pratiwi et al., 2024), the factors that generally underlie the emergence of problems and often appear in other food courts are due to the less-than-optimal arrangement of space elements; the most dominant aspects include inefficient table and chair arrangements, natural openings, and cross-ventilation that are less supportive, and poorly organized booth arrangements. (Sholeh Hadri, 2026) explains that optimizing the layout is important in creating a comfortable and efficient user experience. The arrangement of the booth position is also a very influential aspect for the smooth running of existing activities and procedures, and supports increased food court productivity. An optimal layout considers various factors, such as visitor traffic flow, distance between tables, accessibility to supporting facilities, and the overall comfort of the atmosphere. As explained by (Imantaka & Satwikasari, 2023), openings in the room also affect user comfort because they help circulate air in the room and reduce high humidity. So thermal comfort can also be a benchmark for the satisfaction and comfort of space users. The opening elements in question are opening orientation, position, and ratio to the type of opening that can improve the performance of natural ventilation in the room.

The behavioral approach in architecture emphasizes the relationship between space and human activity to create building and environmental designs that are not only oriented towards physical function but must also consider the psychological, social, and cultural aspects of the user so that overall it is in harmony with the needs of the users who are active in it (Fadhilah & Lissimia, 2023). In line with what was explained by Barker (1975) in Nafiq & Rukayah (2024) about the concept of behavior setting, which is generally used in environmental psychology, every space with physical characteristics can encourage certain



behaviors in it. This is closely related to the behavioral approach theory because the point is that space is not only a container for users to do activities, but also one of the important factors that can shape user behavior.

Previous studies have examined behavioral architecture in terminals and cafes (Fadhilah & Lissimia, 2023; Nafiq, 2024), thermal comfort in markets (Imantaka & Satwikasari, 2023), the optimization of commercial cafe layouts (Zaqia Yuliana Pratiwi et al., 2024), spatial-based food court revitalization and culinary tourism (Sholeh Hadri, 2026), and the influence of spatial composition on visitor appeal (Ismanto, 2023). However, no study has specifically integrated user behavior analysis as the primary basis for a comprehensive redesign of a campus food court. This study contributes through a behavior-responsive design approach that translates user behavior findings directly into design decisions, encompassing the arrangement of activity zones, improvements to the thermal system, lighting optimization, and spatial hierarchy within a single integrated design framework.

This topic was chosen for discussion because the food court is one of the public places at Medan Area University, which has a major influence on the activity and behavior patterns of daily users; the design of the food court area also needs to be improved again through the behavioral architecture approach. Explained by (Linggar Gusti Rhezafabella, Vincentius Totok Noerwasito, 2024), redesign is needed when seeing the condition of the existing design is still not fully able to accommodate the activities and behavior patterns of its users. Therefore, this study is expected to develop a redesign concept that creates a more functional, comfortable, effective, and flexible environment centered on user behavior patterns. After analyzing user activities, a new design will be developed that provides a more efficient circulation system by arranging the booths, tables, and chairs better than before, optimizing natural ventilation in the food court to further increase user comfort.

Research Method

Qualitative methods were used in a case study approach to analyze the relationship between user behavior and the observed spatial conditions. Gaining an in-depth understanding of the relationship between spatial characteristics and user behavior through real-world conditions in the field was key to the application of qualitative methods in this study. This study aimed to identify spatial issues, understand user needs, and analyze the relationship between existing conditions and observed behavioral patterns. The redesign concept was developed based on the results of the analysis as the foundation for the design concept, with the goal of better aligning the space with user needs and its intended functions.

Data collection techniques included field observations, interviews, and questionnaire distribution. The physical conditions of the space, user behavior patterns, comfort levels, and circulation were identified through observations conducted at the food court. Three key informants were involved in the interviews: two students who were active food court users and one vendor operating at the research site. The informants were selected using purposive sampling because they had firsthand experience with the conditions, activities, and issues at the food court, enabling them to provide information relevant to the study.



Questionnaires were distributed to 22 food court users using accidental sampling. Data were collected from respondents encountered directly at the research site who were willing to participate in completing the questionnaire. The questionnaire consisted of six closed-ended questions related to the availability of facilities, lighting and thermal conditions, spatial comfort, and the need for separate smoking and non-smoking areas. The questionnaire employed nominal and ordinal scales according to the characteristics of the questions and was distributed directly to food court users.

Data were collected through field observations, interviews, and questionnaires and were analyzed using a descriptive qualitative approach by grouping the findings based on spatial conditions, user behavior patterns, comfort levels, and the effectiveness of spatial functions. Data grouping was conducted to examine the relationship between existing spatial conditions and user behavior during activities. The categorized data were then interpreted to identify the main issues affecting the quality of the space for users and to determine the design requirements. The interpretation results were evaluated based on the principles of comfort, efficiency, and spatial flexibility. The evaluation results were subsequently translated into design concepts involving spatial layout, circulation planning, and the provision of supporting facilities. The results of the data analysis served as the basis for developing a redesign concept capable of responding to users' needs in a functional and targeted manner while accommodating existing behavioral patterns. To ensure the credibility of the data, this study employed methods of triangulation and source triangulation. Method triangulation was conducted by comparing the results of observations, interviews, and questionnaires, while source triangulation was conducted by comparing information obtained from the two student informants and the vendor. Through this process, the collected data complemented and reinforced one another, thereby enhancing the credibility of the analysis used as the basis for developing the redesign concept.

Result and Discussion

Research Location

The Medan Area University Food Court is a meeting point for individuals located on Jalan H. Agus Salim Siregar 5, Kenangan Baru, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra. The food court features several food stalls offering a variety of menus. The food court facilitates user mobility and activities around the campus.

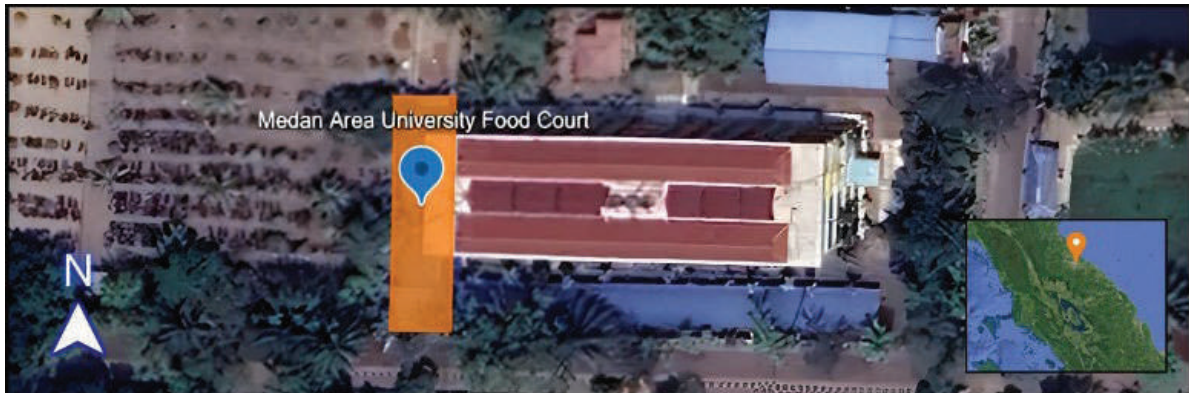


Figure 1. Location of Medan Area University Food Court

Google Earth, 2026

The food court is located in one of the educational areas in Medan, North Sumatera, Indonesia. Namely, Medan Area University, flanked by buildings within the campus that influence the surrounding food court.

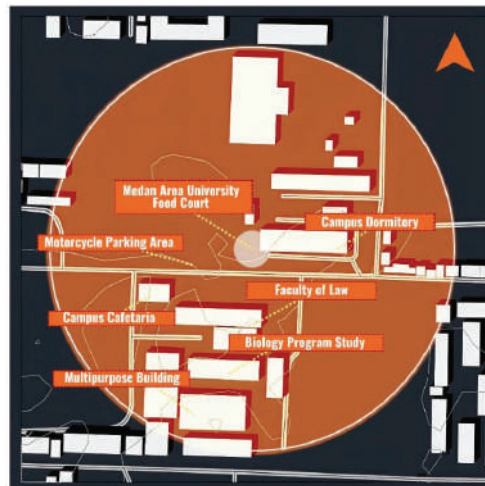


Figure 2. Buildings on Radius 500 meters

Topo Export and Modified by the Author, 2026

The food court's location is currently quite strategic, as it's located between the dormitory buildings and the motorcycle parking area at Medan Area University. Furthermore, a frequently traveled road runs in front of the food court, making it easy for visitors to access it.

Behavior Mapping Analysis

Based on the results of the analysis related to behavior, it was found that visitors or users tend to use the dining area in the inner (red) and front (orange) food court when compared to the middle (yellow) dining area, this is influenced by the heat of the sun that



directly enters the middle of the food court without any second protection in that part of the food court.

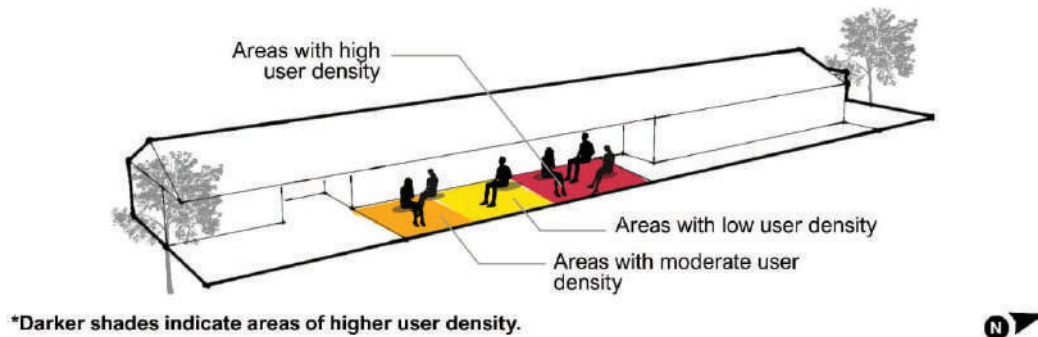


Figure 3. Mapping of User Behavior

Primary Data Analysis, 2026

The inner area (red) is the first option users choose to finish their meal. If the first option is full, the front area (orange) becomes their preferred location, and the middle area (yellow) is their last option if the first and second options are already occupied by other users. Some customers also simply purchase and then eat elsewhere simply because the middle area is available.

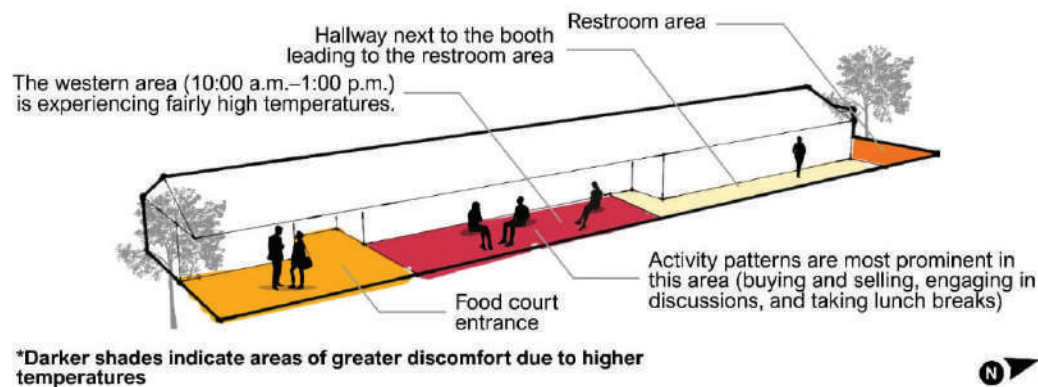


Figure 4. Response to Existing

Primary Data Analysis, 2026

Visitor behavior indicates a problem in the central (yellow) dining area of the food court, leading users to prefer the inner (red) dining area, which is enclosed by walls. This impacts the comfort of using the food court. The lack of comfort in the food court makes the area seem useless, as visitors will choose other dining options rather than eat in an uncomfortable area. In other words, if not addressed, the food court will slowly become deserted and left behind.



Circulation Patterns and Spatial Planning

Circulation and spatial arrangement in a food court are closely related to user movement when entering the food court area, finding seats, and exiting the food court area. Circulation areas must be clearly designed to facilitate user movement.

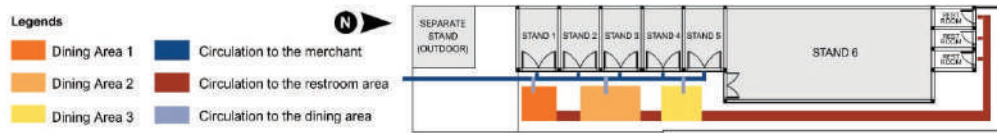


Figure 5. Circulation Pattern at Food Court

Primary Data Analysis, 2026

Figure 5 shows that the circulation pattern is still not well organized. The circulation pattern from the vendors to the bathrooms is still disconnected, potentially causing confusion among users. There are three dining areas separated by tables and chairs. These dining areas are relatively small with a fairly large number of stalls. The circulation to the bathrooms is also narrow and difficult to navigate due to the presence of tables and chairs around them. User behavior is also related to this circulation pattern; the effect of this circulation problem is a buildup of users at certain hours. The narrow circulation to the bathrooms also results in walking behavior that tends to be slow and avoid each other when passing each other. Poor area layout also makes users feel uncomfortable lingering in the food court. Thus, circulation patterns and spatial arrangement have a significant impact on user behavior.

Condition of the Food Court

Circulation and spatial arrangement in a food court are closely related to user movement when entering the food court area, finding seats, and exiting the food court area. Circulation areas must be clearly designed to facilitate user movement. Food court facilities are crucial for ensuring comfort, safety, and functionality. The condition of the Medan Area University food court is not entirely comfortable, as tables and chairs do not meet campus standards.

Based on observations, various issues were identified at the Medan Area University food court that could impact user comfort. The following are some of the issues identified at the food court.

Table 1. Problems at the Food Court

Problems	Explanation
Tables and chairs do not meet needs and standards	The tables and chairs provided do not meet user comfort standards. There is an imbalance between the height of the chairs and the tables, making users uncomfortable for long periods of sitting.
Overhang too low	Based on observations, overhangs do not meet standard heights. The overhangs are between 2.5 meters high, allowing the heat from the roof to be felt directly by users.



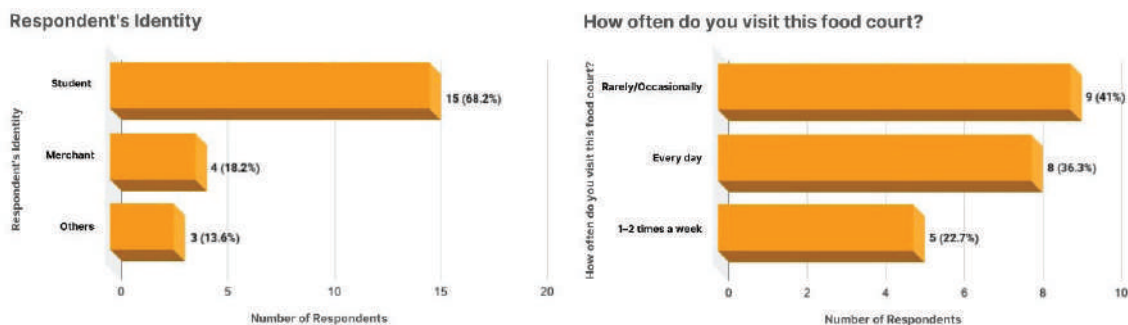
Problems	Explanation
The roof is too low and the wrong choice of materials	The roof is at a height of 2.5 meters without a ceiling base and uses spandex roofing material, so that with this distance the heat received will be directly felt by the user.
Lots of cigarette smoke in the middle of the busy food court users	The large amount of cigarette smoke in the food court causes discomfort for some food court visitors and the condition of the food court which is already crowded with irregular user positions is an additional factor that makes the food court feel even hotter and stuffy.
Lack of trash cans	The number of trash cans in the food court is relatively small, namely only one, and often left full, resulting in a buildup of trash in the area.

Primary Data Analysis, 2026

Based on the table above, according to (Andrian, 2024), tables and chairs have standards specifically intended for dining areas; generally, they must be related to ergonomic principles. Overhang design also needs to be considered; Rambe et al. (2023) stated that overhang design must carefully consider climate factors and optimal dimensions to overcome cooling needs. The choice of roof material also has a direct effect on thermal comfort in the room (Rahmat et al., 2017). A smoking area is also needed to separate smokers and non-smokers. Based on (Rosyadi & Kurniawan, 2023), the smoking area functions to ensure the comfort of smokers and non-smokers. As specified by (Salsabila et al., 2024), the addition of trash can facilities must be done to maintain environmental cleanliness and encourage the habit of disposing of trash properly.

Respondent Characteristic

The characteristics of respondents in this study are based on the results of a questionnaire distributed to users of the Medan Area University food court, which includes respondent identity, frequency of visits, and time of visit to the food court.



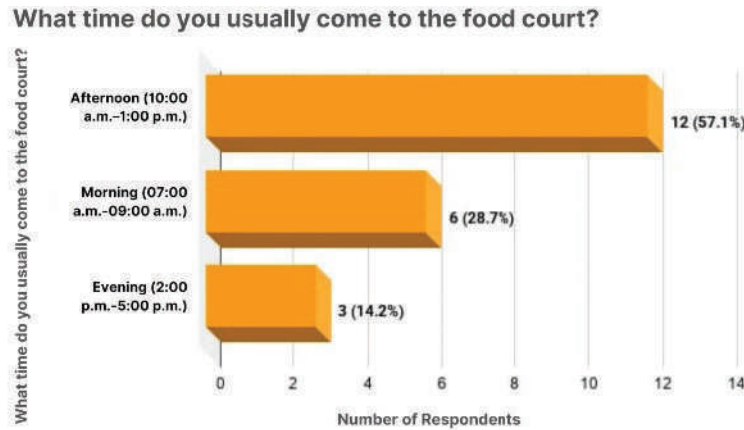


Figure 6. Identity Diagram and Frequency of Visits
Primary Data Analysis, 2026

From the questionnaire data, it can be concluded that the majority of food court users are students. In terms of visit frequency, the questionnaire results showed that 9 respondents rarely visited the food court, while the other 8 respondents visited the food court daily, with the highest visit time being during the day between 10:00 and 1:00 PM WIB. This indicates that the Medan Area University food court has a fairly high level of use and is one of the facilities that supports users' daily activities on campus.

Result of User Perception Analysis

The results of the questionnaire analysis show user perceptions based on 6 closed questions related to the availability of facilities, lighting and temperature quality, room comfort, and the need for separation of smoking and non-smoking areas.

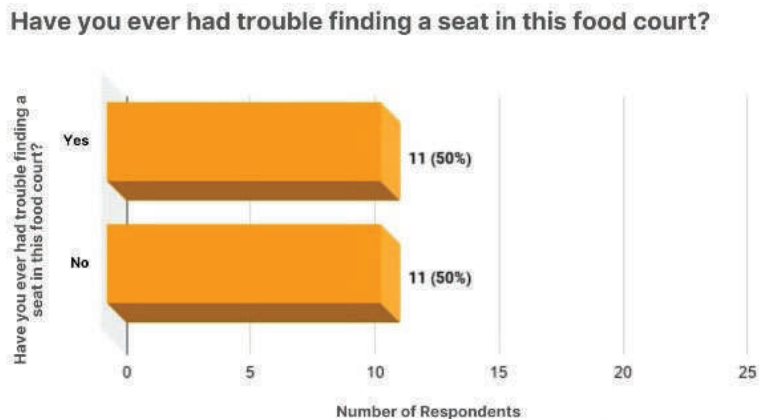


Figure 7. Facility Convenience Diagram
Primary Data Analysis, 2026



Based on the diagram above, 11 respondents reported having experienced difficulty finding a seat in the food court, while another 11 respondents stated they had never experienced any difficulty. The results indicate that seating capacity could be further reviewed, particularly during peak visitor times.

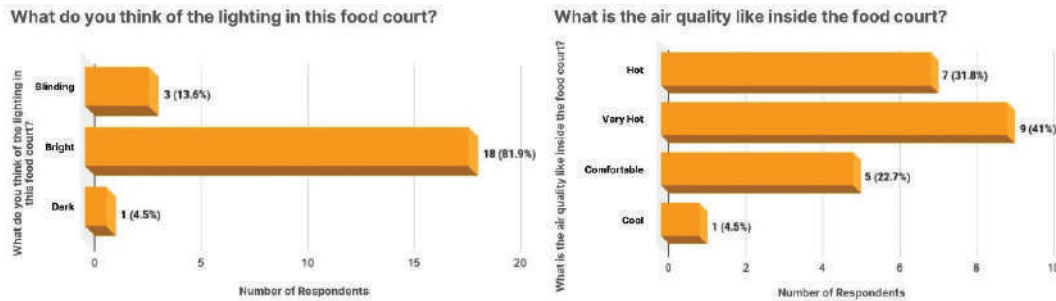


Figure 8. Lighting and Temperature Diagram

Primary Data Analysis, 2026

Based on the diagram above, 18 respondents rated the lighting as bright enough, with 9 respondents rating the temperature as very hot, and 8 respondents stating it felt hot. This data indicates that the lighting quality is quite good, although thermal conditions are still uncomfortable for most users.

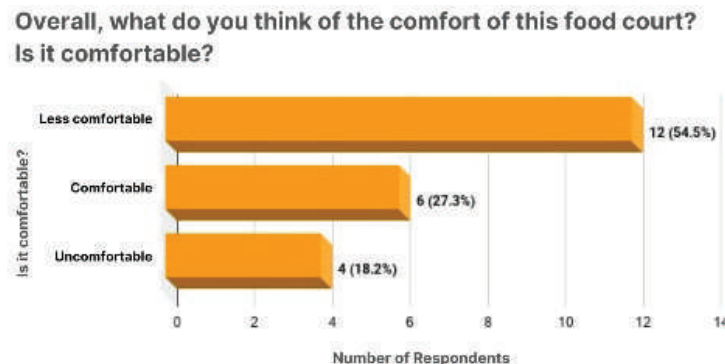


Figure 9. Comfort Level Diagram

Primary Data Analysis, 2026

Based on the diagram above, comfort in the food court is considered less comfortable based on the answers from 12 respondents; 6 respondents felt comfortable, and 4 other respondents felt uncomfortable.

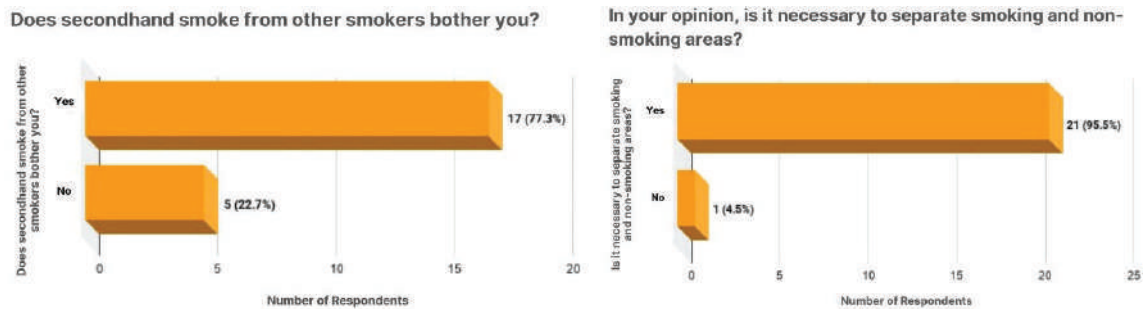


Figure 10. Diagram of Comfort Regarding Cigarette Smoke and Separation of Smoking Areas
Primary Data Analysis, 2026

Based on the diagram above, 17 respondents stated that cigarette smoke from other users disrupted their comfort while working in the food court, and 21 respondents stated that there needed to be separate smoking and non-smoking areas. The questionnaire results indicate that the presence of cigarette smoke is a factor affecting user comfort, necessitating the establishment of a smoking area. This result is supported by (Sintawati et al., 2025), who stated the importance of providing adequate smoking facilities to regulate and reduce the spread of cigarette smoke so as not to disturb non-smokers.

Interviews were conducted with two students and one vendor at the Medan Area University food court. From the informants' accounts, we found that the temperature in the food court was relatively hot. This was caused by several factors, such as the low ceiling, the high number of visitors during peak hours like lunchtime, and the weather. This finding was reinforced by an informant's statement, "The temperature in the food court depends on the weather, but it often feels hot." From this quote, we conclude that the high heat is caused by environmental conditions, but this does not prevent visitors or vendors from enduring discomfort. Therefore, we proposed the idea of redesigning the food court into an enclosed space, while still considering air circulation through partitions or window grilles to ensure user comfort.

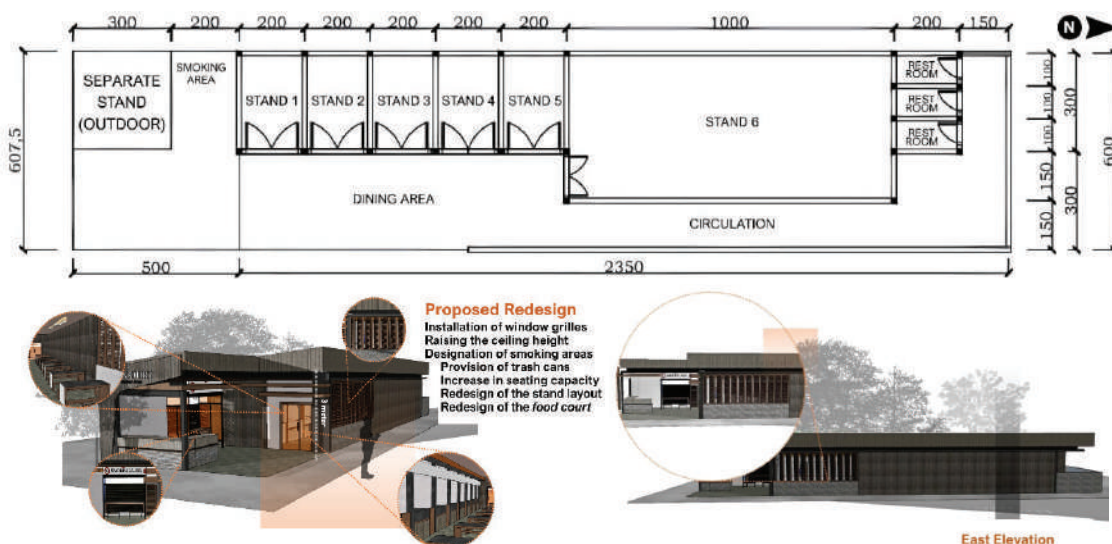
In interviews, we also found that the food court facilities were inadequate, making users feel uncomfortable. The availability of tables and chairs in the food court was also insufficient to meet the needs of the large number of users. This was supported by a statement from one informant who said, "There are enough tables and chairs for customers, but during peak hours like lunchtime, there are not enough, so many people just buy and leave." Supporting facilities, such as trash cans, were also inadequate to accommodate the existing needs, as their placement was suboptimal. There were only three trash cans located very far from the food court, making it difficult for some people to reach them and creating litter, making the food court look visually dirty. This observation is supported by a statement from an informant who noted, "There aren't enough trash cans; only three are available, and they're located far apart. Makes many people litter." Based on the two statements above, we conclude that the food court facilities need to be improved by increasing the number of tables and chairs and ensuring the availability of trash cans placed in convenient locations, thereby maintaining users' comfort while they eat and socialize. Discomfort is also based on noise



and cigarette smoke in the food court area. The lack of clear separation of areas makes visitors uncomfortable with cigarette smoke emitted by other visitors.

This makes some visitors uncomfortable while doing activities and spending time in the food court. This is supported by an informant who stated, "Many visitors like to smoke, so the smoke creates a cloud of smoke that makes people uncomfortable during lunch." This statement can be concluded that there should be a separation of smoking and non-smoking areas to provide comfort for both parties without restricting one party. Therefore, it is recommended to create a smoking area equipped with tables and chairs to increase the comfort of other visitors, so both parties can continue their activities comfortably without being disturbed by other users. From the results of the observations, activities in the food court area are not limited to eating and drinking; it is also used as a space to relax, discuss assignments, or wait for the next lecture. Students generally come in small groups of four to six people. User activity patterns are also not always favorable, as evidenced by our observations, which show several negative behaviors, such as users smoking in the food court area. This habit has the potential to disrupt the comfort of other users without a clear separation of smoking and non-smoking zones. In terms of cleanliness, the food court area is also not fully maintained. Leftover food, drink packaging, and small pieces of trash were found on several tables after use. This situation indicates that the cleanliness management system and user awareness of environmental cleanliness still need improvement.

Insufficient chairs and tables are also a common problem, as capacity is insufficient to meet user needs, leading to a tendency to take chairs or tables from other areas to accommodate their groups. Another issue affecting user comfort is the ceiling, which is only about 2.5 meters from the floor, which causes thermal issues due to the suboptimal ventilation system. Therefore, a solution to all these problems could be a redesign.





The redesign was carried out based on the needs and behavior patterns of users in the Medan Area University food court, such as changing and adding table shapes according to user needs, separating smoking and non-smoking areas, and adapting to existing conditions. A sense of comfort can be created by providing green open spaces that meet people's needs, a well-planned division of activity zones, and a comprehensive range of supporting facilities designed to enhance the experience for a diverse range of users (Abdillah & Widodo, 2026).



Figure 12. Exterior and Interior
Primary Data Analysis, 2026

The smoking area is placed outside the enclosed space for more effective air circulation, while the tables and chairs are rearranged according to the needs of food court users. According to (Haryadi, 2024), a food court, which is an active space, must be able to accommodate various activities, accommodate design forms, and be able to respond to the complexity of these needs as a whole. The organization of the spatial layout can also be done without reducing the visual range by adding partitions or lattice elements (Widyakusuma, 2020).

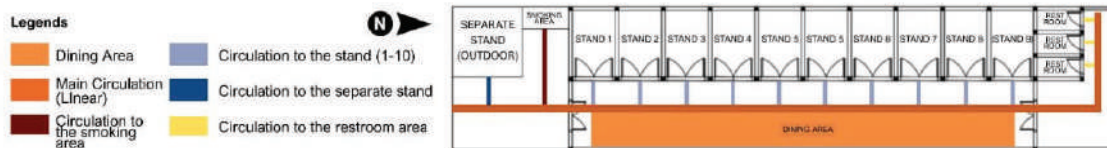


Figure 13. Circulation Redesign
Primary Data Analysis, 2026

Another design response is a change in the circulation pattern, as seen in Figure 13. The circulation pattern is more organized because there are no breaks in the main circulation pattern, providing a more effective way to reach each section of the food court.

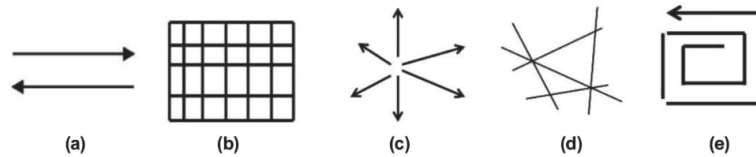


Figure 14. Circulation Pattern According to Francis DK Ching, 1993

Francis D.K Ching, 1993

The circulation pattern used in this food court redesign is a linear circulation pattern. As stated by Francis D.K. Ching (1993) (Wildan & Raidi, 2023), there are five types of circulation patterns that can maximize the circulation of the space used. These are the linear circulation pattern, the radial circulation pattern, the spiral circulation pattern, the network circulation pattern, and finally the grid circulation pattern.

Conclusion

The conditions of the Medan Area University Food Court were found to fall short of spatial comfort standards, as evidenced by a layout unsuited to group activities, disorganized circulation, and users' adaptive behaviors. The research hypothesis was confirmed; a user-behavior-based redesign successfully improved the quality of the space in terms of thermal, visual, and social aspects through the implementation of cluster seating, cross-ventilation, increased ceiling height, smoking zones, lighting optimization, and lattice partitions. The scientific contribution of this study is the integration of behavioral analysis as the primary basis for a comprehensive redesign of the campus food court, which had not been done in previous studies. The study's limitations include a limited observation period and a focus on a single study site. Future research is recommended to conduct a post-occupancy evaluation following implementation and to expand the study to include acoustic aspects and universal accessibility.

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