

## POST-OCCUPANCY EVALUATION OF A UNIVERSITY SHOPPING MALL FACILITY

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### Abstract

Post-occupancy evaluation (POE) is a performance assessment methodology, which can be applied to determine the level of user satisfaction with any given facility. Since university shopping malls could have an impact on the students' academic experience and well-being, it is of paramount significance that university shopping mall facilities are designed and operated to the highest standards. The Extensive literature review highlighted the lack of POE studies for assessing the quality of shopping mall facilities. This study aims at addressing this gap, by presenting the findings of an investigative POE of a university shopping mall facility. The Literature review was conducted pertaining to the technical and functional performance requirements of shopping malls. Twenty-nine performance indicators were identified for shopping mall facilities. These were grouped under five categories, namely building performance, safety and security, proximity and accessibility, space planning and layout, and mall services. A questionnaire survey was developed based on the identified performance indicators. The survey was administered to obtain the students' feedback on the university shopping mall facility. In addition, a walkthrough tour of the mall facility was performed to identify issues, which can be immediately recognized. Finally, a plan of action was developed to improve the performance of the shopping mall facility. The study is beneficial to planners, architects and facilities managers of such facilities.

**Keywords:** Post-occupancy evaluation; Performance indicators; Shopping malls; University campus.

## 1. INTRODUCTION

Shopping malls can be defined as a group of retail stores, which are conceived, constructed, owned and managed as a unit [1]. They are a modern adaptation of the historical marketplace and have become an integral part of urban societies nowadays. Shopping malls are enclosed structures, which are climate-controlled, artificially and naturally lighted, and contain retail stores on both, or one side of a walkway [2]. Modern shopping malls are becoming more dynamic, diverging from conventional shopping centers to aesthetically appealing and unique facilities that satisfy modern consumers [3]. They include diverse func-

tions, including entertainment and food facilities to enhance the user experience [4].

The evolution of shopping malls to include entertainment and food consumption facilities has meant that they can be considered as community buildings, rather than solely retail buildings. Thus, the popularity of shopping malls has recently increased in university campus settings, where the target customers are students [5]. The variety of facilities and services a shopping mall offers depends on its targeted users. For example, a shopping mall located on a university campus should become a center of attraction for students, through the variety of services that the shopping mall offers to students.

Students become frequent users of mall facilities not only for shopping, but also for social gathering, learning, knowledge sharing, or for simply spending leisure time. University shopping malls have a significant role in supporting the students beyond their learning needs, and hence, could significantly contribute in providing a better university experience to students. [6, 7]. Students' basic needs related to catering, exercise, and entertainment should be provided in a university shopping mall.

Post-occupancy evaluation (POE) is a performance assessment methodology that can be applied to determine the level of user satisfaction with any given facility. POE has been defined as "the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time" [8]. POE is used to determine whether or not the building's performance requirements are being satisfied through the decisions made by the planners, designers, and facilities management professionals [9]. The findings of the POE provide practical benefits to a wide spectrum of stakeholders in the building project. For instance, the findings of POE for a particular building can be utilized for benchmarking the performance requirements for similar buildings [10] and developing a knowledge base of performance requirements and standards for future projects [11]. In addition, POE assists in improving vital communication links between clients and building professionals, for the purpose of ensuring better functionality during the service life of the building [12]. The findings of the POE would potentially benefit design professionals to assess the effectiveness of novel, or alternative designs, provide a tool to measure performance and diagnose potential issues, assist in program review during the renovation or adaptive reuse of projects [13].

Since university shopping malls could have an impact on the students' academic experience and well-being, it is of paramount significance that university shopping mall facilities are designed and operated to the highest standards. The shopping mall facility should satisfy the students' desired technical and functional requirements of the mall's built environment. Hence, this study aims to demonstrate the application of POE to assess the students' level of satisfaction with on-campus university shopping mall facilities. A shopping mall facility, located on the campus of a public university in the Eastern Province of Saudi Arabia, was selected as a case study. The focus of the study is on the evaluation of the built-environment only, and not on the evaluation of the commercial services provided in the building.

## 2. PREVIOUS STUDIES

An extensive review of the literature on the performance evaluation of university campus facilities has identified several studies that reported on the use of POE to evaluate the quality of the built environment in various building types. These studies utilized several data collection methods, including photographic documentation, walkthrough analysis, empirical measurements, questionnaire surveys and focus group meetings.

POE studies [14, 15] were carried out to assess the performance of research and academic library facilities in university campuses. Various studies reported on diverse findings pertaining to conducting POE in educational facilities [16, 17, 18, 19, 20, 21, 22], as well as student housing facilities [23]. Similarly, numerous other studies were carried out to assess the quality of student housings [24, 25, 26, 27, 28, 29]. Other POE studies were carried out to evaluate the quality of architectural design studio facilities for students [30], as well as the quality of the built-environment of a student cafeteria, in a university campus [10]. The POE-based framework was developed to assess the quality of the faculty housing facilities. The framework identified a comprehensive set of performance requirements to assess the quality of campus residential facilities. The developed framework was implemented in a case study of 30 residential units [31]. A recent POE was conducted to evaluate the performance of research and academic laboratories. The assessment methods included walkthroughs and questionnaire surveys [32].

However, studies on POE of the built-environment in commercial facilities are very limited in the literature. Studies on shopping mall facilities are focused on presenting the "attractiveness factors" in these type of facilities [33]. For example, a survey aimed at evaluating the customer's level of satisfaction of a shopping mall was conducted in Indonesia. The study indicated that service quality is the most significant attractiveness factor for customers [34]. Similarly, a survey to identify the attractiveness factors in shopping malls was conducted in Saudi Arabia. The study indicated that "aesthetics, convenience and accessibility, product variety, entertainment, and service quality" had a positive effect on the customers of shopping malls [35].

These attractiveness factors for shopping malls can be interpreted through the various types of stores, internal environment, services and utilities, convenience and accessibility, acoustics, leisure and entertainment facilities. However, some of these factors

may not relate directly to the built-environment, but rather focus on the customer services and range of products. In addition, some attractiveness factors may not apply to university shopping malls. Thus, additional factors may need to be investigated. Hence, the attractiveness factors presented in existing studies have been extensively studied to develop the key performance requirements for a university shopping mall facility.

Since studies related to POE of the designed built environment in shopping mall facilities in university campuses are non-existent, this present study will address this gap and demonstrate the application of POE to evaluate the satisfaction of students with a university shopping mall facility. The POE of the university shopping mall in this study is based on several performance requirements. These requirements can be classified into two types, namely: technical and functional performance requirements [10]. The technical performance requirements include building performance and indoor environment aspects of the facility including thermal comfort, acoustical comfort, visual comfort, and indoor air quality. On the other hand, the functional performance requirements include proximity and accessibility, space planning and layout, and mall services.

### 3. PERFORMANCE REQUIREMENTS FOR SHOPPING MALL FACILITIES

In the POE process, certain key performance requirements are evaluated, which are unique to the type of the building being evaluated.

#### 3.1. Technical Performance Requirements

##### 3.1.1. Building Performance

The building performance indicators are the factors which shape the indoor environment of the shopping mall facility. These indicators include thermal comfort, visual comfort, acoustical comfort, and indoor air quality. The indoor environment of the shopping mall is essential to ensure that users have a satisfactory experience, and are willing to stay and return to the mall [3, 34, 36]. Within the indoor environment, the thermal comfort factor indicates the mall users' level of satisfaction with the thermal environment. Several elements influence the thermal environment, including relative humidity, air temperature, temperature of the walls adjoining the indoor space, clothing of the individual and air speed [10]. Visual comfort indicates the amount of natural and artificial lighting

within the shopping mall space. It is important that the shopping mall facility is well lit to ensure the overall ambience of the mall to satisfy the users [37]. Acoustical comfort ensures that users are not annoyed by the ambient level of noise in the mall facility. Noise and poor acoustics in a shopping mall facility will distract and disturb users, and eventually result in the users leaving the facility [38].

##### 3.1.2. Safety and Security

Safety and security are critical to ensure that shopping mall users are comfortable in spending their time in the vicinity of the mall facility. These aspects have a strong impact on the satisfaction level of the mall users. When users feel that the shopping mall is vulnerable to hazardous and criminal acts, they will not return to the mall [39]. Fire safety is of utmost importance in a shopping mall environment. In the event of a fire, large groups of people would need to be evacuated within a short period of time. Adequate fire exits and safety signage in every sales area, occupied area, and shop passage, is necessary so mall users are aware of the available exits at all times [40].

#### 3.2. Functional Performance Requirements

##### 3.2.1. Proximity and Accessibility

Proximity to other academic buildings in the university campus affects the satisfaction levels of users with the shopping mall. In an academic environment, this includes the distance of the facility from student housing, academic buildings and parking [10]. Accessibility of the shopping mall to students would also affect the level of user satisfaction with the building [35]. The availability of sufficient car parking spaces as well as convenient stores' opening and closing times are significant accessibility aspects to the students in the university. Proximity of the shopping mall to other academic facilities and accessibility of the mall to students ensures that it can be conveniently accessed and visited when required by the users [3, 34, 36, 39, 41].

##### 3.2.2. Space Planning and Layout

Space planning and layout determines how convenient it is for users to move around in the shopping mall facility, and locate the amenities they desire. When the layout of the mall is complex, users would experience difficulties in locating amenities. This would be considered a poor experience [39]. The layout of the shopping mall should provide for the ease

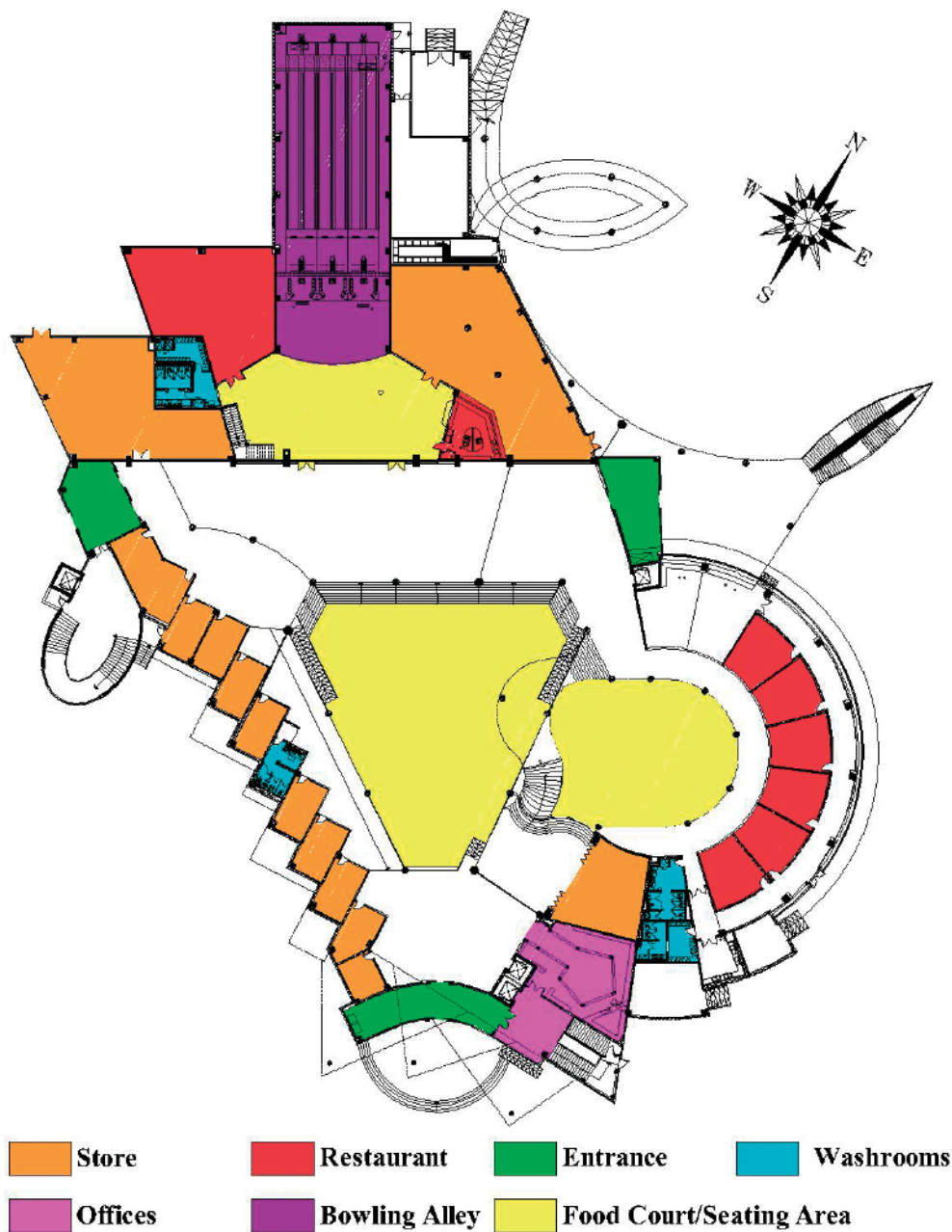


Figure 1.  
Floor plan of the shopping mall facility

of users' flow throughout the facility [42]. Effective layouts consider the appropriateness of the location of shops relative to other services, such as restaurants or toilets. Adequate directional signage is essential for guiding users to the locations of the various stores or services [40].

### 3.2.3. Mall Services

The variety and quality of services provided by the shopping mall facility are essential to satisfy the users [3]. Adequate provision of quality retail services is vital to ensure that the mall facility provides the needed range of products demanded by the users [37, 39]. These services include restaurants, leisure and entertainment areas, automatic teller machines, as well as clean circulation areas and toilets [43].



Figure 2.  
Exterior image of the shopping mall facility

## 4. RESEARCH METHODOLOGY

### 4.1. Building Description

The case study used in the present research is a shopping mall located at the campus of a public university, located in the Eastern Province of Saudi Arabia. The mall provides the students with different kinds of amenities including restaurants, entertainment areas, study rooms, and various other shops. The shopping

mall has been functioning for around 6 years and has become an integral part of the students' life at the university.

The mall is a three-story facility with shops located around an atrium, which is covered with a local architectural style tent roof. The ground floor of the shopping mall contains mostly of the services and includes around 200 m<sup>2</sup> of open plan food court area, and 600 m<sup>2</sup> of open plan multi-purpose hall. In addition, there are 20 restaurants, 2 laundries, 5 coffee shops, a bank, a bowling area, a supermarket, a barbershop, and a stationery store. The first floor is mostly student administration areas, multipurpose area, student club offices, computer laboratories and game rooms. The second floor consists of mall administration offices. The shopping mall location is adjacent to the students' housing zone in the campus and serves mainly the students. Hence, the feedback obtained on the post-occupancy conditions is from students only. Figure 1 presents a floor plan of the case study building. The exterior view of the mall facility is shown in Figure 2, while Figure 3 shows the atrium covered with the tent roof inside the mall facility.



Figure 3.  
Interior image of the shopping mall facility

## 4.2. POE Approaches

POE can be conducted on three levels of effort, namely indicative analysis, using quick walkthroughs; investigative analysis involving interviews and questionnaire surveys; and diagnostic analysis which require intensive collection of data [8]. The higher the level of effort, the more multifaceted the POE process is. The amount of available information and resources influence the approach selected for conducting the POE [44]. This study employs an investigative approach, therefore, a walkthrough and questionnaire survey have been used to collect the data. A combination of multiple data collection techniques results in much clearer and focused POE findings [45].

### 4.2.1. Walkthrough Tour

A walkthrough is a tour in the facility to identify the issues, which need to be investigated further [29]. A walkthrough helps in determining the visible building issues, such as deteriorated interior finishes, space deficiencies in the building, or other defects that impact the functionality of the building. To obtain a broader perspective of the condition of the shopping mall facility, a walkthrough tour was conducted by the POE team, moving through the entire facility, to observe any immediate underlying issues.

### 4.2.2. Questionnaire Survey

The identified performance requirements for the shopping mall facility were used to develop a questionnaire survey. A set of concise performance indicators were identified within each performance element. The questionnaire survey was divided into two main sections, namely technical performance indicators and functional performance indicators. The technical performance indicators were further divided into two sub-sections, namely building performance and safety and security, while the functional performance indicators were divided into three sub-sections, namely proximity and accessibility, space planning and layout, and mall services. The developed questionnaire survey was administered to the students using a paper-based and online approaches. A four-point Likert scale was adopted, in which survey respondents were requested to evaluate the performance indicators by selecting one of four terms, namely “strongly satisfied”, “satisfied”, “dissatisfied” and “strongly dissatisfied”.

## 4.3. Data Analysis

A total of 100 responses were collected from university students, who are frequent users of the shopping mall facility. The responses were tabulated and processed. The weighted mean response for each of the 29 performance indicator was calculated, using the following equation [21]:

$$S_j = \frac{(\sum_{i=1}^4 w_{ij} n_i)}{(\sum_{i=1}^4 n_i)} \quad (1)$$

Where:

$S_j$  is the weighted mean response.

$n_i$  is the number of survey respondents who evaluated the performance indicator  $j$ .

$W_i$  is the assigned weight to the satisfaction rate ( $i = 1, 2, 3$  or  $4$ ).

Table 1 presents the assigned ranges of the weighted means.

**Table 1.**  
The assigned ranges of the weighted means

| Satisfaction rate     | Corresponding weight | Range of weighted mean |
|-----------------------|----------------------|------------------------|
| Strongly Satisfied    | 4                    | 3.50 – 4               |
| Satisfied             | 3                    | 2.50 – 3.49            |
| Dissatisfied          | 2                    | 1.50 – 2.49            |
| Strongly Dissatisfied | 1                    | 0 – 1.49               |

## 5. FINDINGS

The respondents' satisfaction level with each of the identified 8 technical performance indicators and 21 functional performance indicators are presented in Table 2. Table 2 presents a summary of all the indicators and the overall rating of the shopping mall facility by the survey participants. Generally, the users are satisfied with the shopping mall services. However, few performance indicators are not satisfying the mall users, as discussed below.

### 5.1. Technical Performance Indicators

#### 5.1.1. Building Performance

This category included five indicators, as indicated in Table 2. Students who responded to the questionnaire survey were satisfied with four out of five indicators, namely thermal comfort, visual comfort (through artificial lighting), visual comfort (through natural lighting), and indoor air quality. The students were dissatisfied with the acoustical comfort (noise level). The walkthrough tour indicated that the ambient temperature, in all spaces, was well regulated. Ample artificial

**Table 2.**  
Technical and performance requirements and their satisfaction rates

| Performance requirements            |                                               | Evaluation terms |    |    |    | Mean response | Rate of satisfaction |
|-------------------------------------|-----------------------------------------------|------------------|----|----|----|---------------|----------------------|
|                                     |                                               | SS               | S  | D  | SD |               |                      |
| Technical performance requirements  |                                               |                  |    |    |    |               |                      |
| Building performance                |                                               |                  |    |    |    | 3.10          | S                    |
| 1.                                  | Thermal comfort (temperature)                 | 41               | 47 | 9  | 3  | 3.26          | S                    |
| 2.                                  | Visual comfort (through artificial lighting)  | 47               | 39 | 11 | 3  | 3.30          | S                    |
| 3.                                  | Visual comfort (through natural lighting)     | 44               | 43 | 9  | 4  | 3.27          | S                    |
| 4.                                  | Acoustical comfort (noise level)              | 17               | 35 | 26 | 22 | 2.47          | D                    |
| 5.                                  | Indoor air quality                            | 34               | 53 | 11 | 2  | 3.19          | S                    |
| Safety and security                 |                                               |                  |    |    |    | 3.02          | S                    |
| 6.                                  | General safety precautions                    | 24               | 58 | 14 | 4  | 3.02          | S                    |
| 7.                                  | Fire safety precautions                       | 22               | 57 | 18 | 3  | 2.98          | S                    |
| 8.                                  | Security                                      | 28               | 53 | 15 | 4  | 3.05          | S                    |
| Functional performance requirements |                                               |                  |    |    |    |               |                      |
| Proximity and accessibility         |                                               |                  |    |    |    | 2.77          | S                    |
| 1.                                  | Location from student housing                 | 49               | 35 | 11 | 5  | 3.28          | S                    |
| 2.                                  | Location from academic buildings              | 9                | 34 | 36 | 21 | 2.31          | D                    |
| 3.                                  | Location from parking                         | 34               | 41 | 20 | 5  | 3.04          | S                    |
| 4.                                  | Availability of parking                       | 17               | 23 | 27 | 33 | 2.24          | D                    |
| 5.                                  | Store opening timings                         | 30               | 47 | 14 | 9  | 2.98          | S                    |
| Space planning and layout           |                                               |                  |    |    |    | 3.01          | S                    |
| 6.                                  | Circulation (ease of movement)                | 39               | 48 | 10 | 3  | 3.23          | S                    |
| 7.                                  | Wayfinding (finding the shops)                | 50               | 38 | 9  | 3  | 3.35          | S                    |
| 8.                                  | Presence of direction signs                   | 17               | 36 | 33 | 14 | 2.56          | S                    |
| 9.                                  | Location of washrooms                         | 18               | 45 | 22 | 15 | 2.66          | S                    |
| 10.                                 | Location of shops/restaurants                 | 43               | 47 | 8  | 2  | 3.31          | S                    |
| 11.                                 | Number of seating areas                       | 30               | 42 | 23 | 5  | 2.97          | S                    |
| 12.                                 | Location of the court relative to restaurants | 43               | 41 | 14 | 2  | 3.25          | S                    |
| Mall services                       |                                               |                  |    |    |    | 2.73          | S                    |
| 13.                                 | Number of retail services                     | 20               | 44 | 26 | 10 | 2.74          | S                    |
| 14.                                 | Quality of retail services                    | 15               | 56 | 23 | 6  | 2.80          | S                    |
| 15.                                 | Number of restaurants                         | 31               | 41 | 22 | 6  | 2.97          | S                    |
| 16.                                 | Quality of restaurants                        | 23               | 56 | 18 | 3  | 2.99          | S                    |
| 17.                                 | Number of entertainment areas                 | 8                | 17 | 35 | 40 | 1.93          | D                    |
| 18.                                 | Quality of entertainment areas                | 11               | 18 | 36 | 35 | 2.05          | D                    |
| 19.                                 | Cleanliness of the mall                       | 41               | 47 | 8  | 4  | 3.25          | S                    |
| 20.                                 | Lost and found service                        | 13               | 48 | 23 | 16 | 2.58          | S                    |
| 21.                                 | Number of automatic teller machines           | 40               | 45 | 13 | 2  | 3.23          | S                    |

Note: SS = Strongly Satisfied; S = Satisfied; D = Dissatisfied; and SD = Strongly Dissatisfied

and natural lighting levels are present in the sitting areas, as well as in all shops of the mall. There were also no observed concerns with the indoor air quality. The walkthrough tour revealed that users were not comfortable with the amount of noise generated in the shopping mall. The main reason for this dissatisfaction is that the main multi-purpose hall of the shopping mall generates a large amount of echo. The echo is mainly attributed to the fact that large areas of the

walls at the multi-purpose hall are being exposed, with no sound absorption material. Therefore, these walls reflect much of the sound into the main hall, creating unwanted noise. The result is that users are not being able to listen to each other clearly, thus, feeling uncomfortable due to high noise levels. Nevertheless, the overall satisfaction level with the five indicators in this category was “Satisfied”, with an average response of 3.10, as indicated in Table 2.

### 5.1.2. Safety and Security

This category included three indicators, as indicated in Table 2. Respondents to the questionnaire survey were satisfied with all three indicators, namely general safety precautions, fire safety precautions, and security. The shopping mall is located in a gated university campus, and the entrance to the area is continuously monitored by the university's security department. The shopping mall also employs a security guard. Therefore, users are satisfied with the security services. The walkthrough tour of the facility indicated that fire exits are clearly marked, and fire suppression systems including fire extinguishers and fire hose cabinets are distributed throughout the shopping mall sufficiently. Thus, the users were satisfied with fire safety precautions.

## 5.2. Functional Performance Indicators

### 5.2.1. Proximity and Accessibility

This category included five indicators, as indicated in Table 2. Students who responded to the questionnaire survey were satisfied with three out of five indicators, namely location of the mall facility from student housing, location of the mall facility from parking, and store opening timings. The students were dissatisfied with the location of the mall facility from academic buildings, and the availability of parking. It was observed that most students were able to easily reach the shopping mall facility through walking, cycling, driving, or using the bus. However, the location of the shopping mall, relative to the academic buildings is quite far. Therefore, this performance indicator received a dissatisfaction rating. As students may choose to access the mall through driving, the survey findings indicated that they were not satisfied with the availability of parking near the shopping mall facility. It was observed that the parking lot is located directly next to the mall facility. However, it is always full. The parking lot was seen to be designed in an inefficient manner, as a lot of area is wasted. This area could have been used to maximize the number of car parking places. Additionally, the parking lot is also used by students who live in the nearby student housing. Thus, the excessive use of the inefficiently designed parking lot renders it to be always full and causes the mall users to wait to find a parking spot. While there are parking structures nearby, these are located over 100 meters away from the shopping mall facility, which is a fair walking distance, considering the harsh climate of the city throughout most of the year. Thus, the users of the

shopping mall facility were not satisfied with the availability of parking. Nevertheless, the overall satisfaction level with the five indicators in this category, as perceived by the students, was "Satisfied", with an average response of 2.77, as indicated in Table 2.

### 5.2.2. Space Planning and Layout

This category included eight indicators, as shown in Table 2. Respondents to the questionnaire survey were satisfied with all eight indicators, namely circulation (ease of movement), wayfinding (finding the shops), presence of direction signs, location of washrooms, location of shops/restaurants, number of seating areas, and location of food court relative to restaurants. It was observed in the walkthrough tour of the facility that there are plenty of seating areas in the main hall and the food court. Furthermore, the food court is located next to the restaurants, and, as a result, is in an ideal location. Furthermore, due to the simple central layout of the mall, the users can move around in the mall to easily locate shops, restaurants, washrooms, and exits.

### 5.2.3. Mall Services

This category included nine indicators, as indicated in table 2. Students who responded to the questionnaire survey were satisfied with three out of five indicators, namely number and quality of retail services, a number and quality of restaurants, cleanliness of the mall, lost and found service, and number of automatic teller machines. These findings were supported by the observations made during the walkthrough tour. The students, however, were dissatisfied with the number and quality of entertainment areas. The walkthrough tour revealed that the designed entertainment areas are not being maintained effectively. It was observed that most of the spaces including the bowling area, table tennis, snooker and gaming areas have ceased to function, and are no longer operating. Thus, there is a lack of entertainment options for students in the shopping mall facility, and consequently, most of the users are dissatisfied with them. Nevertheless, the overall satisfaction level with the nine performance indicators in this category was "Satisfied", with an average response of 2.73, as indicated in Table 2.

## 6. CONCLUSION AND RECOMMENDATIONS

This study presented the findings of an investigative POE assessment of a shopping mall facility, located in the campus of a public university in the Eastern Province of Saudi Arabia. Feedback on the performance of the shopping mall facility was collected using a walkthrough tour and a questionnaire survey. The mean response was calculated for each of the technical and functional performance categories, namely, building performance, safety and security, proximity and accessibility, space planning and layout and mall services. Generally, the shopping mall users are satisfied with the performance of the facility. However, there is room for significant improvement in its performance. This can be achieved by implementing the listed recommendations, which are developed on the basis of the findings of the questionnaire survey and walkthrough tour. These recommendations include:

- Installing sound absorption panels on the walls of the main multi-purpose halls. Sound absorption panels will prevent the echo from generating in the hall, and thus, reduce the level of noise.
- Re-designing the car parking lot to use the available space more efficiently. This has the potential to create extra car parking spaces, and hence, accommodate much higher numbers of vehicles. Furthermore, the use of the parking lot should be restricted to the shopping mall users only.
- Properly maintaining the entertainment areas in the shopping mall facility. While space has been allocated for entertainment purposes, currently, it is not maintained effectually.
- Addressing the customer complaints adequately, and making proper use of the provided customer complaint units in the shopping mall facility.

An extensive literature review highlighted that no previous studies exists on the POE of on-campus shopping mall facilities, in spite of the importance of shopping mall facilities to students in the university environment. The results of the POE presented in this study are for the shopping mall facility investigated. However, the methodology of the study, specifically the structure of the questionnaire survey, can be adopted for other on-campus shopping mall facilities as well. A lack of agreed and reliable indicators remains one of the weak points of POE, however, the indicators presented in this study can also be adopted for other studies provided that they are properly adjusted to cater to the facility being

reviewed. In conclusion, this paper adopted a systematic approach for evaluating the technical and functional performance of a university shopping mall facility, and the findings present key areas where improvements can be made to increase customer satisfaction levels.

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