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PERCEIVING THE TRANSITION OF URBAN CAMPUS OPEN SPACES UNDER THE INFLUENCE OF COVID-19

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Abstract

The open spaces on campus provide great opportunities to engage in beneficial outdoor activities. However, due to the COVID-19 outbreak, campus users have experienced several periods of isolation, which has affected perceptions of the environment and practical use of these public spaces. To investigate how campus users, connect with adjacent open spaces under the influence of pandemic restrictions, the authors conducted a case study at six selected sites on the Universiti Malaya (UM) campus. The results show that the current lockdown has reduced frequency and differences in daily use at the selected sites. Some landscape furniture and vegetation were removed or replaced as regular maintenance, while the primary users changed from students to staff. Nevertheless, the perceived aesthetic appeal and previous outdoor experiences in the selected open spaces stimulated emotional attachments to the physical campus and a widespread appreciation of the green spaces on campus. The results can serve as a practical basis for interventions for campus users' psychological restoration during this transition and provide theoretical support for investigating higher quotient stimulation of spatial senses to enhance landscape design strategies.

Keywords: Campus open space, Perception, Users, Utilisation

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INTRODUCTION

Malek and Nashar (2018) consider green open space as part of the sustainable component that promotes liveability and active community. The outbreak of COVID-19 has led to the need to reappraise the value of urban green spaces (Pouso et al., 2021). According to Brooks et al. (2020), open spaces with vegetation motivate recovery from mental health problems associated with the lockdown. As a prominent part of the urban green space system, campus open spaces are essential to student mental health (Ghaus et al., 2017). There have been restrictions on the use of open spaces on urban university campuses. Access to most open spaces has been currently prohibited (Stockwell et al., 2021). It is critical to balance campus users' expectations for physical spaces with the need to break the chain of COVID-19 transmission on campus (Deshmukh, 2021). As Conrad et al. (2021) mentioned, many presidents of higher education institutions have suggested that student mental health should be one of their primary concerns because the lockdown has exacerbated student anxiety, depression, and loneliness. This concern has raised further calls for how to enter the physical campus safely and what changes to normal operations might be necessary to protect students and staff (Gressman & Peck, 2020).

Several studies have shown the expectations students have about the characteristics of different educational environments (Ali et al., 2020). A better understanding of how open spaces are used under the influence of the ongoing "physical distancing" may facilitate management strategies within university campuses (Conrad et al., 2021). However, very few evaluations have linked students' mental restoration to the lockdown precautions of open space on campus (Gressman & Peck, 2020). An investigation of campus open space use and perceptions of these open spaces could improve pandemic prevention strategies on campus with consideration of student psychological wellbeing. Thus, this study was conducted with the following two objectives: (i) to investigate differences in the occupancy patterns of selected open spaces in an urban university, and (ii) to explore the users' perceptions while considering the psychological impact of the pandemic. The relevant background, methodology, findings, discussion, and conclusions of this study are outlined below.

RESEARCH BACKGROUND

Participants' perceptions of design factors promote opportunities for optimal use of the outdoor environment (Bakar et al., 2020). The interactivity of a landscaped space depends on the activities perceived from the supportiveness of its environmental settings, as the landscape's character shapes a place's environment and ambience (Wahab et al., 2018). It has been proven that the design attributes of open space on campus determine its functional use and users' perceptions. In an urban university, soft landscapes provide greenery with aesthetic values and

optimise the microclimate (Jamaludin et al., 2014). In contrast, campus users regard hard landscapes as more interactive and participatory (Fan et al., 2020; Malek & Nashar, 2018). Since the appearance of landscape elements dominates the qualities of open spaces, the corresponding changes are expected to influence users' perceptions and participation (Akhir et al., 2021).

In response to the COVID-19, the Malaysia government has taken national quarantine measures, known as The Movement Control Order (MCO). An extended phase followed this, referred to as Conditional Movement Control Order (CMCO), in which regulations were relaxed and outdoor exercises were allowed with social distancing (Conrad et al., 2021). Lim et al. (2021) have found that the pandemic occurrence in urban areas with higher population densities had a more significant impact on environmental sustainability and quality of life for people. It suggests that managing green spaces on urban universities may encounter greater challenges than rural or suburban areas. Working from home during CMCO has reduced urban activities (Pouso et al., 2021). Restrictions on access to the physical campus and "social distancing" measures have expanded online learning approaches and reduced the use of adjacent open spaces (Ali et al., 2020). Compared to the various evaluations of student academic performance, there is less information on how open spaces affect students' mental health (Yaman et al., 2018). Chen et al. (2016) have suggested that user satisfaction with design features and the use of facilities are the factors for assessing the salutogenic aspects of green spaces. It indicates that feedback from users may reflect the psychological impact of green spaces on campus during the pandemic.

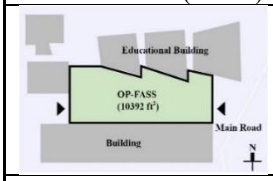
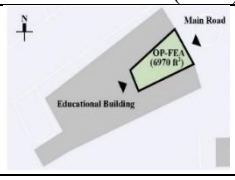
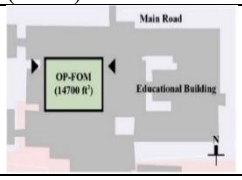
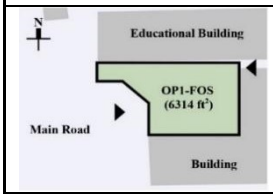
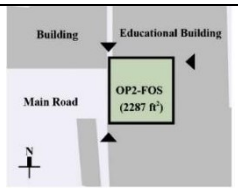
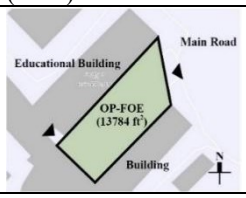
A case study is a practical approach to investigating the use of open spaces (Harun et al., 2017). Universiti Malaya (UM), the oldest public university in Malaysia, has a campus in the middle of Kuala Lumpur (Keat et al., 2016). Unlike other public universities in the suburbs, the urban environment affects the outdoor environment of UM due to the conjunction with the city traffic system (Fan et al., 2020). At the same time, this campus has preserved sufficient green space compared to the newer urban campuses, which are compact and have many restrictions on the arrangement of open spaces (Fan et al., 2020). The campus must represent the social health context of urban universities with climatic-adaptive open space design (Jamaludin et al., 2016). Several studies on sustainable environments and biological design have used the UM campus as a case study and provide reliable data for a future study of its green spaces (Keat et al., 2016; Jamaludin et al., 2014). In addition, human interactions in open spaces are in various dimensions (Ibrahim et al., 2018). The criteria used to evaluate the quality of open spaces are accessibility, attractiveness, functionality, and safety (Fatiah et al., 2021). Ibrahim et al. (2013) have classified urban green spaces in size, function, use, quality, area, accessibility, and facilities to explore their positive influence on maintaining wellbeing. These design factors dominate the

available services of green space (Akhir et al., 2021). The sites selected should be accessible, frequently used, and activity supportive.

RESEARCH METHODOLOGY

The authors conducted a comparative case study to investigate how CMCO affects the perception and use of selected open spaces on campus. Students and staff spend most of their day in the educational buildings and frequently use the adjacent open spaces (Fan et al., 2020). Based on the criteria mentioned above, six open spaces surrounding educational buildings in five faculties on the UM campus were selected as case study sites, as shown in Table 1.

Table 1: Selected open spaces as case studies

The codes, locations, and layouts of the selected open spaces as case studies		
Case study 1: OP-FASS, Faculty of Arts and Social Science (FASS)	Case study 2: OP-FEA, Faculty of Economics and Administration (FEA)	Case study 3: OP2-FOM, Faculty of Medicine (FOM)
		
Case study 4: OP1-FOS, Faculty of Science (FOS)	Case study 5: OP2-FOS, FOS	Case study 6: OP-FOE, Faculty of Engineering (FOE)
		

Source: Author (2022)

An on-site observation was conducted in two separate periods before and during the CMCO to capture changes in the landscape and the type and frequency of users. It is because the observation method is often used at the beginning of observing and analysing the associations of users' activities with a particular environment (Hussein, 2012). The landscape features, number and type of users are the assessment criteria for the occupancy pattern. The authors observed from 8:30 a.m. to 5:30 p.m. on weekdays to record the frequency of users. The CMCO observation conducted before CMCO was from June to October 2019 and was initially used to evaluate the landscaping of the campus green spaces. After the pandemic outbreak, the corresponding observation data were collected during CMCO from November to December 2020.

The psychological impact of the pandemic is evaluated based on the aroused emotions and experiences of the users while using the space. An online interview was conducted with students from the selected faculties to obtain their perceptions of the case study sites, as the conduction of interviews can effectively and efficiently reflect the satisfaction, preferences and psychological interactions of the respondents (Harun et al., 2017). A purposive sampling method was used to identify interviewees who frequently visited the sites. This interview section was processed during CMCO from November 2020 to February 2021.

FINDINGS

Case study 1: OP-FASS

The researcher noted that some marginal plants, such as shrubs and ground cover, were replaced. Accordingly, the lockdown also affected the adjacent external environment of OP-FASS. As shown in Figure 1a, the parking area adjacent to the entrance lobby was always crowded during rush hours, but on weekdays during the lockdown, the same area was relatively empty. Students and staff sat in the lobby and walked beside the garden. The corridor connected to the faculty building was frequently used for educational activities, walking between buildings, sitting, and resting. However, these same areas mainly served non-academic staff during the lockdown. For example, several female janitors were observed sitting together, talking, and getting water from the water dispenser in the lobby (see Figure 1b). The interviewees expressed fear of going outside and touching the surfaces of the furniture. The green views and quietness created a relaxing atmosphere that positively relieved stress and created a desire for more greenery outdoors.

> *"I miss the greenness of this garden and the smell of grass a lot… I have not been outside for long since I attended online classes. It is heightening my anxiety. I want to breathe the fresh air outdoors, but the cases are soaring all the time." (Postgraduate from FASS, 23rd December 2020)*

> *"I feel like I can memorise more lines when I am reading there… but who knows what I touched?" (Undergraduate from FASS, 19th January 2021)*


(a)

(b)

Figure 1: The appearance of OP-FASS, (a) A comparison of the type of users and activity (b) The adjacent car park before (left) and during (right) the CMCO
Source: Author (2020)

Case study 2: OP-FEA

The configuration of the vegetation remained the same. Only the potted plants were removed from the corner of the lawn, while the other plants were in good condition. The place was closed for months after the outbreak of the COVID-19 pandemic. It was no longer allowed to be entered or used, as shown in Figure 2a. Many students lingered on the shaded lawn between 12:00 pm and 1:00 pm, talking and resting. But during CMCO, the café on the ground floor was temporarily closed due to the cancellation of physical classes (see Figure 2b). Besides, the recreational facilities around this area were removed and cleaned up. The interview results show that interviewees generally feared the conditions of the environment more than they desired. The closure of the surrounding cafés and shops reduced the desire to stay. However, there was still a provision for open-air recreational activities on this site.

> *"I used to exercise a bit with my friends here…but should I miss this place? I don't have a reason to come here. The whole campus is empty, nothing to eat and nothing to do…" (Undergraduate from FEA, 10th February 2021)*

> *"It is ok for me to lock this area; I agree with it… even though I often had my breaks and got some food under the tree shade when I got physical classes." (Undergraduate from FEA, 3rd February 2021)*


(a)

(b)

Figure 2: The appearance of OP-FEA, (a) The corridor with vegetative landscapes (b) The use of the adjacent cafe before (left) and during the lockdown (right)
Source: Author (2020)

Case study 3: OP2-FOM

The construction works on the building façade next to the path with the stone pergola affected the use of this site, which was the most significant transformation of this place. The path was closed for the repair of the building surface. Workers used the other walkway under the sloping lawn more frequently to maintain machinery and walk through (see Figure 3a). As shown in Figure 3b, users still had access to the rest of the garden, but with certain restrictions, which resulted in it being used less during working hours. For example, a warning sign was posted to remind people to keep social distance. The landscape furniture was hardly used, in contrast to the previous record. The closure of the adjacent café reduced the number of users dramatically. Several interviewees mentioned that they still preferred to enjoy the view of the garden when walking along the adjacent open corridor. However, the most simply walked by without entering inside because the adjoining café was closed.

> *"Before I lived in the dorm in our residential hall, and here is a social place where I often sit… But since the COVID-19 situation started, I already lived off the campus…." (Postgraduate from FOM, 7th January 2021)*

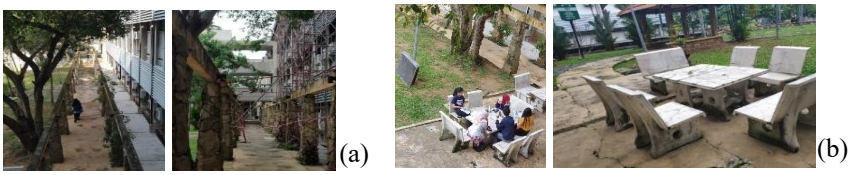
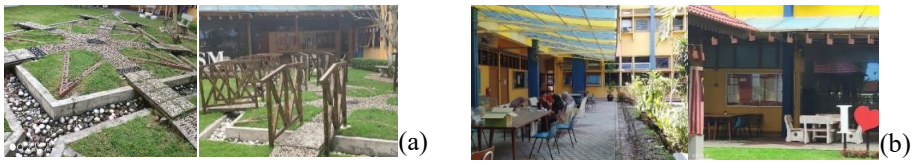


Figure 3: The appearance of OP-FOM, (a) The path with the stone pergola used for walking, (b) Landscape furniture before (left) and during the CMCO (right)
Source: Author (2020)

Case study 4: OP1-FOS

The main activities observed during CMCO were staff walking through the pathways to get into the building or water the plants. Access to recreational areas, such as platforms and lawns, was not permitted. Many landscape furniture items, such as seats and tables, were no longer allowed to be used. Both hard and soft landscapes changed during the lockdown. One noticeable change occurred at the landmark in the middle of the lawn patch, with the addition of several wooden bridges over the cobbled pavement (see Figure 4a). Ground-covering plants were replaced with several species of herbs and shrubs. Even the covered lobby remained almost unchanged, as the absence of students made the green yard quiet and empty (as shown in Figure 4b). Other interviewees pointed out the place was used for open-air recreation and social activities. They expressed that social life and academic performance depended on the physical campus.

"I miss the nice view of the green area… As for my study, I cannot focus on the internet as I did in the classroom. I used to talk to my friends after class. We have lunch together and play together. If I have questions about our lesson, I just ask them. But now I am in this isolated box, and I feel my good grades are slipping away somehow…" (Undergraduate from FOS, 17th December 2021)



(a) (b)

Figure 4: The appearance of OP1-FOS, (a) The landmark before (left) and the modification made (right), (b) The use of the covered lobby
Source: Author (2020)

Case study 5: OP2-FOS

The staff remained the primary users of the space. The original ornamental plants were removed or replaced, especially the potted plants. The reduction of vegetative landscapes made the yard's overall appearance different from its earlier appearance. The potted flowers and herbs replaced the decorative landscape of colourful plants with the faculty logo on the steps (see Figure 5a). The covered corridor and benches were still frequently used to walk between building blocks, with a warning sign posted for social distancing. A desk was placed beside the walkway to register visitors as a COVID-19 safety measure (see Figure 5b). Interviewees included students and staff who visited or walked through this area daily. Most expressed concerns about online learning and a desire to enjoy the peaceful green view, cool breeze, and shade in this courtyard. However, a few students mentioned that they prefer online classes due to the time it takes to travel.

"I just passed through this area a few days ago because I needed to pick up some files. Online classes are comfortable because I don't have to take the train to reach the campus. I used to come to sit on the benches.… I like the plants, and the green is so eye-relaxing." (Postgraduate from FOS, 20th January 2021)

(a) (b)

Figure 5: The appearance of OP2-FOS, (a) The steps and the faculty logo before (left) and after ornamental plant removal (right), (b) Use of the covered corridor
Source: Author (2020)

Case study 6: OP-FOE

Since the entrance area connects several faculty buildings, its accessibility and appearance were not significantly affected by the lockdown. On the contrary, there were noticeable variations in the occurrence of activities, with a relatively significant decrease in user frequency and length of stay. Walking and parking were the main activities that occurred during the observation period, while sedentary activities did not happen. The original plant species remained unchanged and grew in good condition. Although the pavilion seats were kept clean, users used these seats only a few times to put things while standing. Groups gathering in the entrance lobby and on the pathways were no longer recorded (see Figure 6a). Nevertheless, this area was regularly used for parking throughout the lockdown period, with only a slight decrease in occupancy frequency (see Figure 6b). An interviewed researcher mentioned parking and driving became more manageable during the lockdown. Most interviewees expressed that staying in this open space was less necessary after the pandemic.

> *"If I can still come to the campus and use the faculty library, at least I can walk around the yard for some minutes after my writing… the mountain view, and the leaves of trees and flowers can rest my eyes and mind… Staying inside the room gave me more pressure and weight. I am just eating and reading, but not moving at all…." (Undergraduate from FOE, 10th February 2021)*

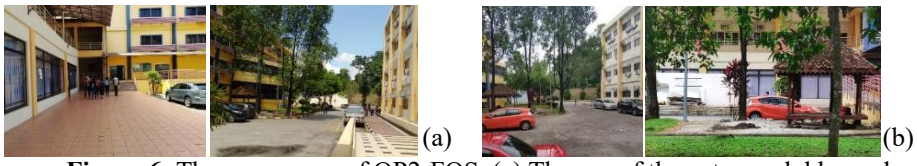

(a) (b)

Figure 6: The occupancy of OP2-FOS, (a) The use of the entrance lobby and pathways before the Covid19 lockdown, (b) The use of adjacent car parks
Source: Author (2020)

To summarise, observation of the six sites indicated several changes in landscape elements. Most students stopped coming to the campus because the curriculum temporarily changed to online classes and discussions. Therefore, the primary user type switched from students to staff. Remarkably, janitors and maintenance workers became regular users. Activities observed during CMCO included walking through, resting, talking, machinery maintenance, and cleaning. Table 2 illustrates the relevant comparisons.

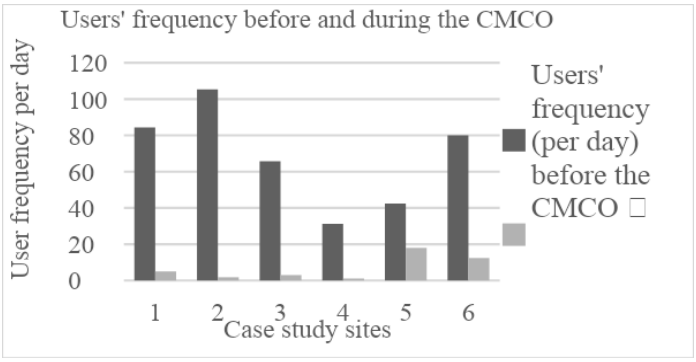
Table 2: Summary of data collection

Case study sites	Daily users before the CMCO	Daily users during the CMCO	No. of interviewees	Differences in landscape elements
1	84.4	5	7	Slight changes in vegetation
2	105.4	1.8	10	No obvious differences recorded
3	65.8	3	8	Refurnishing of building facades
4	31.3	1.1	7	Landmarks and vegetation
5	42.4	18	5	Changes in vegetation
6	80	12.4	9	No obvious differences recorded

Source: Author (2022)

DISCUSSION

Figure 7 shows that all sites experienced drops in user frequency in CMCO. The access ban kept users from visiting OP-FEA and OP1-FOS. OP-FASS and OP2-FOM were used by staff for walking, resting, and maintenance. In comparison, the users' frequency of OP2-FOS and OP-FOE dropped less. Although the COVID-19 outbreak promoted online distance learning, the online interview revealed that researchers in faculties specialising in science subjects still needed to use physical equipment (Hussain et al., 2018). Dependence on the physical environment is valuable in architectural psychology (Bakar et al., 2020). For example, the interviewees from OP-FOE needed the laboratories to conduct their experiments. Besides, most staff needed to use the office building. It explains the relatively higher frequencies at OP-FOE and OP2-FOS. The interviewees frequently used words to express negative emotions during the interview, such as "stressful" and "anxious" (see Figure 8).



1 Depression/disappointment
2 Stress/anxiety
3 Loneliness/ isolation/need of socialising
4 Fear of touching any surface
5 Need of open-air activities
6 Need of greenness

Figure 7: Users' frequency at the case study sites
Source: Author (2022)

Figure 8: Frequency of words
Source: Author (2022)

The results of the interviews showed that the perceived landscape elements are in multi-sensory dimensions. Insight into the different dimensions explains the human interaction experienced in open spaces (Ibrahim et al., 2018). Green spaces benefit urban residents by providing opportunities for contact with nature (Fatiah et al., 2021). Exposure to natural landscapes during activities has improved psychological health (Yaman et al., 2018). After the campus was closed due to the lockdown, students were no longer the primary users of the open spaces, resulting in a greater or lesser decrease in daily frequency. Instead, passing by staff was the most common activity that occurred. The COVID-19 virus attacks physical health and exacerbates psychological suffering among urban residents (Stockwell et al., 2021). Conrad et al. (2021) found that lockdown exacerbated anxiety, depression, and loneliness among students, which is consistent with the findings of this study.

In addition, the feedback showed different attitudes towards the closure of physical spaces due to the lockdown. Some interviewees emphasised that it is difficult to be productive while studying. They felt that the quality of our education diminished due to eliminating some extracurricular activities on campus. This finding highlights the positive psychological influence of the outdoor environment on learning performance (Yaman et al., 2018). On the other hand, the others thought it was more convenient to stay at home because it saved them time and money to travel to their faculties. It indicates the importance of campus walkability as a measure of sustainable development at UM (Keat et al., 2016). Figure 9 shows how interviewees' perceived open spaces during the pandemic. The authors noted the widespread paranoid "avoidance behaviour" described by Stockwell et al. (2021) as avoidance of public spaces. Many interviewees mentioned fear of touching facilities in the open spaces, implying that the sense of touch stimulated environmental fear during the pandemic (Mohd Hussain et al., 2018). Conrad et al. (2021) mentioned that the pandemic negatively affected the students' lives emotionally and academically. However, the interview results also showed that the lockdown experience improved social interaction, togetherness, and the importance of green spaces. On the other hand, this finding is consistent with Pouso et al. (2021) 's statement about the stimulating effect of the campus environment. However, more evidence and systematic evaluations are needed to prove the positive psychology of green spaces in urban universities.

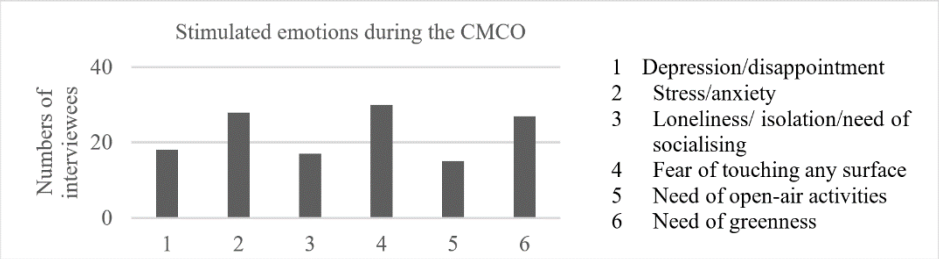


Figure 9: Interviewees' perceptions of case study sites
Source: Author (2022)

CONCLUSION AND RECOMMENDATIONS

The CMCO lockdown has resulted in differences in occupancy of selected open spaces, including reduced user frequency and changes in primary users. The interviewees expressed their dependence on physical spaces. The aesthetic appeal and previous outdoor experiences in the selected open spaces stimulated a positive emotional attachment. However, the insufficient number of respondents did not explain in detail how changes in landscape elements affect users' experiences. Increasing the sample size could provide more evidence of this interaction. However, this study provided evidence for adapting open space design and management strategies. Future studies could focus on interventions to psychologically restore campus users during this transition to improve the university environment.

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