Understanding pocket garden users' perspective for urban campus garden sustainability

Audrey G Muljono¹, Donna Asteria², Denny M Sundara¹and Tri E B Soesilo¹*

¹ School of Environmental Science, Universitas Indonesia, Central Jakarta 10430, Indonesia
² Department of Communication, Faculty of Social and Political Sciences, Universitas Indonesia, Depok 16424, Indonesia
’soesilo@indo.net.id

Abstract. Green open spaces have many functions and positively impact urban communities, both psychologically and physically. Students spend most of their time in the campus area like gardens, but their perspectives are less involved in planning campus gardens as the user of the garden. The condition of the garden as one of the environmental factors depends on the behavior of garden users. On the other hand, the condition of the garden forms the behavior and perspectives of garden users. It is crucial to know users' needs to ensure the sustainability of users' behavior and gardens’ condition. Based on these problems, this study aims to understand users’ perceptions and problems on-site, create a conversation between stakeholders. Questionnaire results were obtained from 36 active garden users by using a purposive sampling method. The results were analyzed descriptively. The questions were divided into three sections regarding users' cognitive, environmental, and behavioral factors—the results actors, user perspectives, and user behavior that are interdependent and form one another. Universities need to start a conversation concerning users’ needs in the campus garden to sustain its condition and a better campus community.

1. Introduction

Before the 19th century, urban development often concentrated on economic and human activities, thereby reducing green areas and the natural environment. Poorly planned cities and inadequate infrastructure investment can cause traffic congestion, pollution, poverty, higher health risk, famine, and disasters. Urban design approach began to change after urban designers realized the importance of maintaining Green Open Space (GOS) for the welfare of urban dwellings [1] and environmental benefits [2]. Simultaneously, numerous land development activities caused land-use change from agricultural land and natural environment to buildings, transport infrastructures, and other facilities. Many cities currently do not have the opportunity to provide adequate space for GOSs; therefore, GOSs are forced to exist in the remaining space, such as between roads or buildings [3].

Urban areas need some educational facilities such as universities, whereas universities become one of the keys to a country's future to produce future leaders [1,4]. Universities are responsible for creating scholars and a better generation who will be responsible for the future of countries' sustainability and development [1]. A similar problem to land-use change occurred in the planning of campuses areas. At first, campuses in the United States, Europe, and Asia were separated from urban activities. They were placed in the peri-urban areas for more than two centuries ago to detach the academic communities from city life [5]. Some campuses can be found inside urban areas due to urban growth, to meet the needs of urban dwellers' education and urban sprawl [2,5]. The GOSs size in urban campuses are usually small and called as pocket gardens. Pocket gardens have a role as aesthetic
views for campus dwellers and the only natural space in the urban campus area. The campus residents spend most of their time in the campus area, including the gardens.

It is estimated that more than 73% of Indonesia's population will live in cities by 2030 [6]. As the capital city of Indonesia, Jakarta has many universities with limited GOSs on their campuses. A step must be taken in planning the urban campus garden to archive Sustainable Development Goals number eleven, which is “Sustainable Cities and Communities.” Universitas Indonesia is located in Salemba. One of Indonesia’s oldest campuses was chosen as a case study because of its unique typology as a compact urban campus completed with pocket gardens. This research is necessary because there has not been much research done focusing on the on-campus garden users' perspective. Previous research has been more focused on users' satisfaction on peri-urban campuses GOSs but not on existing urban campuses pocket gardens. This paper focuses on the essence inside the pocket garden in extension to Salama’s [7], Uren et al.[8], as well as Speake et al.[9]’s studies. The researchers aim to understand users’ perceptions and problems on-site, create a conversation between stakeholders.

1.1. Theoretical background

The campus is often conceptualized as a smaller urban ecosystem, so some efforts must be made to achieve its capabilities, maintaining its natural and social ecosystem from the academic activities. To meet future sustainability, existing and new universities applied the green campus concept to reduce their carbon emissions and use energy efficiently. Unfortunately, campus design pays more attention to building design instead of the GOSs. GOS on campus has a significant role environmentally and economically [9,10]. The GOSs in the urban area can shape its users’ dynamics socially and politically; hence, it represents the delicate relationships between man and nature. The facilities provided in the GOS can shape the users' activities and behavior [11]. Recent studies found that GOSs can positively experience users in social and natural interactions by eliminating feelings of fear and insecurity [1]. Students frequently use green space as a gathering place [12], a place to relax, a place for mental restoration [12–14], to reconnect with nature [15], be inspired [16], and to develop pro-environmental behavior [1]. Students perceived green areas as attractive, open, and free places, so they find it easier to innovate [13] and be more productive when they see or inside the GOS [16]. They prefer to spend time in the GOS than hardened areas [17]. Since campus dwellings spend most of their time on campus areas, it is essential to design and build a comfortable garden. By managing and maximizing these pocket gardens, universities can archive a more sustainable campus with productive academic communities by reducing stress through campus gardens.

Many campuses located in rural areas have the opportunity to provide large GOSs inside their campus. In contrast to that, the phenomenon of limited GOSs can be seen from the availability and typology of parks or gardens on campuses located in urban areas [5]. Urban campuses usually have pocket-sized garden between their buildings [18]. Most designs of GOSs use a European style, which is dominated by ornamental plants to achieve aesthetic value [8]. Aesthetic value is crucial since campus gardens are usually placed on campuses' entrance. As the only realistic view from the buildings—the gardens' condition indirectly reflects the university's image on caring and maintaining its infrastructure. The concentration of planning and design GOSs that only use aesthetic aspects will lessen the GOSs place-making, which decreases the sense of being bound to nature and reduces the diversity of species on land [8].

The quality of the pocket garden also depends on its maintenance from its users. However, the users, which are mostly the students and garden caretakers, are less involved when in planning the campus landscapes. The lack of communication between all stakeholders about designing as well as maintaining the garden, to abandonment and ungroomed landscape on campuses [19]. It can lead to ignorance of the environment [20]. Garden maintenance and cleanliness had been one of the problems because it is hard to improve users’ responsibility to take care of it [21]. The users' behavior can be shaped positively or negatively from their social and living environment. If the condition of their living space, including the campus garden, is unkempt, they will perceive that it is okay not to take care of the natural environment. This phenomenon can lead to engaging inappropriate activity or
behavior the opposite of pro-environmental behavior. Undesirable behavior will lead to more economic and environmental costs. Sustainable development needs to include social, ecological, and economic dimensions. It is essential to include the users’ perspective about their needs and preferences to engagement economical responsibilities and sense of ownership. The selection of the right plants and those with economic value in landscape planning can increase garden maintenance participation.

2. Method
The method includes a description of the case study location and period. The exact location and period are chosen due to the theoretical need, considering all constraints in data accessibility, time availability, and budget support. Last but not least, the method also includes data collection and analysis.

2.1. Research design
The research was conducted on UI Salemba, specifically on the School of Environmental Science and School of Strategic and Global Study GOSs area in November 2019. The School of Environmental Science and School of Strategic and Global Study GOSs area is one of the main entrances and vocal points in UI Salemba. There were two pocket gardens in the School of Environmental Science and School of Strategic and Global Study as the hallway and the assembly point. Most students in UI Salemba are postgraduate students. UI has a policy for both campuses (Depok and Salemba), Rector’s Act issued in 2011, consisted of environmental policy, sustainability policy, green transportation, waste, and toxic waste management, limitation on drinks and food packagings, mitigation, and adaptation of global climate change, reducing paper and plastic usage, clean water conservation, and energy conservation [4]. Unfortunately, GOS has not been mentioned as much as the other variables. The School of Environmental Science also held a green campus program annually and implemented it for every new postgraduate student. The purpose of this program is to improve UI Salemba’s environment towards sustainability.

According to social cognitive theory, users’ behavior on the pocket garden depends on internal and external factors that interact with each factor, which are environmental factors, behavioral factors, and personal cognitive factors [22]. Environmental factors, such as environmental concern and knowledge [22], social norms, influence from the other, and access, can affect personal and behavioral factors. External factors, such as facilities, can affect perceptions and behavior [23]. Personal factors come from individuals to choose, execute, and manage their actions, like personal concern and knowledge, expectation, and attitude [22]. These two factors affect behavioral factors. Behavioral factors are some actions that have been done for a while, like skill, practice, and self-efficacy [24]. Users’ actions and behavior in the pocket garden depend on their internal and external factors. Family, friends, or cultural values and policies they live in might influence some users [1,25]. The way users perceive their behavior to and from society’s reaction will affect his/her perspective and future behavior. Pro-environmental behavior can be nurtured by creating an environmentally friendly campus, whether physically or socially, through GOSs usage and care.

2.2. Respondents
The total population of the pocket garden users was unknown numerically. To determine the number of respondents, the researchers used a purposive sampling method. Questionnaires were distributed at two locations: the assembly point and lobby area classes. The total of all respondents is 36 respondents consisted of 18 respondents in each area. These are the criteria of the respondent; the respondent has been in the campus area for more than a month, uses campus pocket garden at least >3 times per week [26], and spends more than 15-20 minutes on the pocket garden [12,15,26].

2.3. Instruments
The researchers analyzed the results of the questionnaire then count the frequency of their answers descriptively. The questions consisted of three sections to prevent survey fatigue or boredom.
personal cognitive factors consist of users' feeling in the pocket garden, motivation to go to the pocket gardens, users' perception of the pocket gardens. User perception consisted of; the pocket gardens' function according to the user, the pocket gardens values according to the user, positive and negative aspects of the current pocket gardens, and users' expectations and ideas for improvements. The second section contained questions relating to environmental factors from the university’s policy and influence by the other users. The last section was about users’ behavioral factors, such as users’ activities and participation in maintaining gardens.

3. Results and discussion

3.1. Users' cognitive factors

As many as 83.4% of respondents answered, they agree that they feel comfortable in the pocket garden, 75% felt happy, and 63.9% go to the park to relieve stress. Based on their motivation to go to the garden, 44.4% of respondents answered that they went to the park to relax, 25% to socialize, 8.3% to enjoy the scenery, and 5.6% answered to relieve stress. A healthy campus needs to provide students with a formal garden for mental restoration and relieve academic pressure [14]. The results of the questionnaire prove that gardens are vital for students' mental health. Responding students appear to like the room with a garden view, with 91.7% of respondents choose to agree with the statement given (I prefer a room with a view to the garden). Apart from being a place to relieve pressure, the campus garden is useful as a view from the room to facilitate the user greeneries and increases productivity. The results show that the respondents' answers follow Liprini and Coetzee's (2017) [17] research in which students prefer to spend time in the GOS than hardened areas. Campus gardens have a vital role in students' mental health and must be maintained to function optimally to support student academic activities.

In addition to the six motivations that have been given to multiple-choice, 16.7% of respondents answered that; waiting for class/friends, eating, doing assignments, meeting places, and sitting around. Most open-ended answers are linked to social activities, supported by 63.8% of respondents who went to the pocket garden because their colleagues invited them. This result is in line with a previous study where students frequently use green space as a gathering place [13]. There were no respondents who explicitly answered that they were motivated to go to the park to interact with nature, but one reason users use the park is to pet some stray cats. The reason users use the highest garden in a row is because of the presence of chairs, invited colleagues, there is shade, there are plants, strategic location, there are no other options, and there are cats.

Respondents like gardens because they have lots of chairs (33.3%), shady (30.6%), easy to reach (22.2%), have many plants (8.3%), and clean (5.6%). Both areas use the pocket gardens as a place for discussion because they have chairs and easy to reach. Users like to discuss in the hallway area with colleagues after class. They also like the garden because the chairs are covered with shades since a building with four leveled floors surrounds it. The weakness of the hallway area is, there is no access to enter the garden.

In contrast, users in the assembly point area use the garden because of its' location. The assembly point garden is spacious and easy to reach since it is the intersection of several accesses and close to classes and the existing cafeteria. One of the assembly area gardens' weaknesses is that it does not have any shades other than a Banyan tree, and it is relatively barren. Comfortable and shady areas are considered to attract users to relax and interact with colleagues and nature [12,13].

The pocket garden's main aspects sequentially are cleanliness, shades, facilities (chairs, lamps, shade, trash cans), neatness/appearance, access, security, size, diversity of plant species, and signage. As mentioned before, shades and facilities attract users to enjoy the garden, while cleanliness linked to maintaining the garden depends on how the users treat the garden [21]. The respondents do not view the pocket garden’s function as the university's image since it was placed on the bottom of the list. The main functions based on the response is as scenery and shade of the campus. The second response is a place to socialize, followed by a place to relax, urban greeneries and water catchment areas, and a
place for humans connecting with nature. The results of student respondents contradict the research of Speake et al. (2013) [9] and Hanan (2013) [10] because aesthetics depend on the user's view. Users will declare the park as a university's image if the garden functions meet the needs and provide benefits to the users. Unattainable aesthetics will produce an image of the university that is not a priority for garden users if park conditions are still not optimal.

3.2. Environmental factors
Respondents disagreed with the statement that the pocket garden had been treated optimally (63.9%), was beautiful (58.3%). They are not satisfied with the current condition (61.1%). The result shows that 91.7% of respondents did not get information about the regulations that apply in the garden. The other 8.3% respondents answered that they saw some poster which informed the users to "Keep the garden clean" or a "No Smoking" signage. The respondents disagree that it was not a beautiful garden because it had not been treated optimally. The researchers saw some users littering, and there were no actions taken. Since the garden was used as a social space, the behavior will be carried out continuously. If there is no punishment from the social environment [25], then an individual's behavior will be responded to by other users who will then do the same thing [22]. The prevailing social conditions and norms will be accepted into the user's perspective in the form of information to determine the consequences of these actions [1,25].

3.3. Users' behavior factors
The respondents often used the pocket garden areas for; discussion (61.1%), using their cellphones (61.1%), relaxing/resting (52.8%), just passing through (52.7%), and waiting for colleagues (50%). Other activities that were rarely carried out are; doing assignments (66.7%), waiting for photocopies (52.8%), and eating and drinking (33.3%). There were no desk or outlet, so no users can do their assignments with their laptops; hence the environmental factors did not fulfill the user needs. These results contradict that gardens are a place to be inspired [16]. The overall pro-environmental behavior of the respondents was excellent. 47.2% of respondents answered strongly agree, followed by 41.7% agree, and 11.1% of respondents are neutral to the statement, "I should not pick any plants." Almost every respondent strongly agrees (69.4%) and agrees (30.4%) concerning the statement, "I shall not litter." Lastly, there were some respondents strongly disagree (2.8%) and disagree (5.6%) with the statement of, "I do not spit into the campus garden." In contrast, most of the respondents answered agree (22.2%) and strongly agreed (69.4%). The respondent's answer can be biased because there is a tendency for people to answer behavioral questions with the best answer.

The results can be validated by looking at their results regarding the cleanliness and conditions of the garden. Based on their results, they are not satisfied with the current conditions. Garden users often practice spitting, and have become a habit. Spitting is widely prohibited because it can spread disease and is considered rude. Environmental pressure in the form of social and environmental conditions can prevent this behavior from being carried out. Social influences can affect individual behavior where family, colleagues, cultural values can influence a person's behavior. When the environment and social pressure runs, individuals will hesitate to do this behavior, so if the garden conditions can be improved. The users do not feel responsible for their behavior even though they know it is inappropriate. For example, inadequate or lack of facilities, such as not providing lots of trash bins, users tend to solve this problem with practicality, such as littering [23].

4. Conclusion
The sustainability of urban campus pocket gardens can be optimized with every stakeholder's help in the university. Our results show that the students used the gardens for relaxing and social activities. The perspective of the pocket garden users has not been supported by environmental factors, both in garden facilities and social influences. Clearer policy and socialization to all users will help maintain the condition of the garden. The users feel uncomfortable in the garden since the current facilities did not fulfill their needs and expectations. They expect to have a shaded garden and facilities to support
academic activities. The university needs to start a conversation regarding the user needs and provide more information as well as socialization about garden regulations. By fulfilling their needs and socialize regulations, the user will sustain the garden's condition and be a better community. These findings cannot be generalized to other universities or sites. Suggestions for future research to conduct more broad surveys. The researchers are interested in continuing this research by implementing an edible garden on the urban campus.

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