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Article

Students' Perception on Campus Land Use: A Case Study on Patuakhali Science and Technology University

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ABSTRACT
Patterns of land use are vital in university campuses. Proper land use is regarded not only its landscape design but also upgraded the level of the university. The study revealed the students' perception of land use at Patuakhali Science and Technology University, Bangladesh. The quantitative method was applied through a structured questionnaire survey using the Likert scale among the students of all seven faculties situated on the main campus of the university. The collected data were analyzed through appropriate statistical methods. More than half of the students chose the playground as their favourite zone, while Independence Square was the lowest. Meeting at the teacher and student center (TSC) was the most preferred zone among the different reasons for their desire. About 16.43% and 31.43% of the students supposed that there were insufficient green and blue spaces respectively, and above four-fifths of them replied about having moderate to sufficient green spaces. A large portion, about 80 to 95% of the respondents replied about their dissatisfaction with the location of the academic, TSC, and library building. A number of recommendations werealso made by the students, and more than half said that increasing green space would enhance aesthetic views and ecological balance. The students alsosuggested the rearrangement of the teachers' dormitory from the main campus, developing road facilities, separating academic buildings for each faculty, inaugurating monumental artwork, moving nearby markets, and increasing academic area mostly.
Keywords: campus land use; green space; open space; perception; university.

RESUMO
Padrões de uso do solo são vitais em campi universitários. O uso adequado do solo é considerado não apenas seu projeto paisagístico, mas também elevou o nível da universidade. O estudo revelou a percepção dos alunos sobre o uso do solo na Patuakhali Science and Technology University, Bangladesh. O método quantitativo foi aplicado por meio de uma pesquisa de questionário estruturado usando a escala Likert entre os alunos de todas as sete faculdades situadas no campus principal da universidade. Os dados coletados foram analisados por meio de métodos estatísticos apropriados. Mais da metade dos alunos escolheu o playground como sua zona favorita, enquanto a Independence Square foi a mais baixa. O encontro no centro de professores e alunos (TSC) foi a zona mais preferida entre os diferentes motivos de seu desejo. Cerca de 16,43% e 31,43% dos alunos supuseram que havia espaços verdes e azuis insuficientes, respectivamente, e mais de quatro quintos deles responderam sobre ter espaços verdes moderados a suficientes. Uma grande parcela, cerca de 80 a 95% dos entrevistados, respondeu sobre sua insatisfação com a localização do prédio acadêmico, TSC e biblioteca. Uma série de recomendações também foram feitas pelos alunos, e mais da metade disse que aumentar o espaço verde melhoraria as vistas estéticas e o equilíbrio ecológico. Os alunos também sugeriram a reorganização do dormitório dos professores do campus principal, desenvolvendo instalações rodoviárias, separando os prédios acadêmicos para cada faculdade, inaugurando obras de arte monumentais, movendo mercados próximos e aumentando principalmente a área acadêmica.
Palavras-chave: uso do solo no campus; espaçoverde; espaçoaberto; percepção; universidade.

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Introduction

Land use refers to the ways in which humans make use of land. It is also regarded as the transformation, adjustment, and management of physical environments into developed environments, including human settlements, farming, transportation, manufacturing, recreation, and open areas (Anderson et al. 1976; Moniruzzaman and Siddik 2011; Siddik, Rahman, and Moniruzzaman 2018; Hasnat, Siddik, and Zaman 2018; Gani et al. 2023). The concept of land utilization has evolved as the global population has seen exponential growth (Siddik and Islam 2024). Understanding land use has become increasingly crucial as the nation seeks to address the challenges of unplanned and unregulated development, declining environmental quality, reduction of agricultural land, destruction of critical wetlands, and loss of fish and wildlife habitat (Siddik and Rahman 2022; Siddik, Akhtar, and Moniruzzaman 2018; Anderson et al. 1976; Hasnat, Siddik, and Zaman 2018). These all increase land transformation by shifting the land use pattern or changing its inherent quality (Siddik and Zaman 2021; Siddik and Rahman 2022; Siddik and Islam 2024).

Campus land use mainly encompasses buildings (academic, administrative, residential, etc.), playgrounds, fields, flower beds, wetlands, trees and vegetative cover, and other spaces for the students (Hipp et al. 2015). It's a combination ofliving, learning, and recreational needs with positive perception (Agheyisi and Ebinum 2019). A well-planned campus is generally used for aesthetic determinations, social communication and recreation for students. Sufficient open spaces on campus make healthier surroundings for staff and students. An attractive open spaces may highlight the standard of a university (Speake et al., 2013). The aesthetic features of open spaces may also influence the students' perception and use of them (Abu-Ghazzeh 1999). The aesthetic quality comprising the colors, organization, pattern, and concentrations of green spaces in the campus influences the mental health of the students (Kaplan, Kaplan, and Brown 1989). Various features of green spaces, including green plants, flowers, and water bodies reduce the stress of the users (Largo-Wight et al. 2011). Open spaces offer some places used for various activities inside and outside the university campus together with walking, sitting, socializing, entertaining, and meeting with friends in the open space (Rufai and Maina 2018).

Campuses of universities and public areas are currently encountering significant problems in terms of their structural design and planning. Furthermore, it presents a novel perspective on the association between the students' perception and the campus atmosphere (Dong et al. 2023). An optimal campus is essential, as young people who reside in universities for an extended duration, away from their homes, are susceptible to experiencing elevated stress levels and adverse health consequences (Atri, Sharma, and Cottrell 2007). The student who use the green spaces of the campus more frequently and ranked higher their overall quality of life (McFarland, Waliczek, and Zajicek 2008). The more access to green space minimizes the psychological suffering (Pope et al. 2015) and increases the intellectual improvement of the students (Dadvand et al. 2015). People who are in touch with nature are better off and pleased with their profession and residence. It was also found that the students chose to study in a campus based on its presence (Boyer 1987). A well-decorated campus is a vital part of the educational experiences of the learners in the academic courses and is connected to the goal of the higher education mission (Scholl and Betrabet Gulwadi 2015). The enough open spaces make improvement of students' social networking (Agheyisi and Ebinum 2019). A well-organized green campus makes benefits in introducing the campus identity (Griffith 1994).

Researchers also revealed that a good aesthetical background supports to develop social identity, safety, and harmony (Budruk, Thomas, and Tyrrell 2009). Green spaces are reflected to overcome the urban heat effect by seizing carbon dioxide (Schipperijn et al. 2010). The abundance of green space is connected with decreased death rates, fatness, misery, nervousness, and heart-related diseases (Coley, Sullivan, and Kuo 1997).

It has also been found that human's mental and physical health depend on the open space (Stephen S. Y. Lau and Yang 2009). The absence of open spaces in the university campus may hamper the prospect ofinvolved with nature and becoming knowledgeable with the campus environment (Agheyisi and Ebinum 2019). A good number of studies have found that living with green spaces assists humans in various techniques, comprising with human well-being and also decreasing psychological stress (Honold et al. 2016; Kuo 2015) boosts learning and creativity (Kuo, Barnes, and Jordan 2019) can also assist to improve social and emotional learning (Chawla 2015). Numerous scholars conducted research specifically examining the utilization of land on campus. Hipp et al. (Hipp et al. 2015) specifically examined the way in which students perceive the presence of green spaces on campus and how it impacts their overall quality of life in the United States. The campus public space is a prominent category of space that plays a crucial part in fostering a vibrant campus atmosphere. In their study, Dong et al. (Dong et al. 2023) conducted a comprehensive analysis of how university public spaces are perceived. Sugiyama et al. (Sugiyama et al. 2008) and Pattanakiat et al. (2024) have discovered the relationship between the perception of greenness in the environment and its impact on both physical and mental well-being.

This study aimed to assess students' perception on campus land use of Patuakhali Science and Technology University, Bangladesh. Specific objectives were to identify the most favouritespots of the campus, to explore students' perception on campus land use, and to document recommendations regarding further land use change.

Materials and Methods

Study area

The Patuakhali Science and Technology University (main campus) is situated in Sreerampur Union (the lowest administrative unit of the local government)in the Dumki sub-district of Patuakhali. It is one of the fastest-growing public universities in Bangladesh. Originally an agricultural college, the institution was officially promoted to a university on July 8, 2000. However, it did not commence its academic activities until February 26, 2002. The university has a single additional campus located in Babuganj sub-district, within the Barishal district. The primary campus with seven undergraduate faculties including faculty of agriculture (FAG), faculty of computer science and engineering (FCSE), faculty of business administration (FBA), faculty of fisheries (FF), faculty of environmental science and disaster management (FESDM), faculty of nutrition and food science (FNFS), and faculty of law and land administration (FLL) is situated in Sreerampur Union surrounded by the captivating allure of traditional Bangladeshi culture and the lush natural environment of the country. The university has a total area of 109.97 acres including 97 acres in main campus and 12.97 acres in Babuganj campus. There are a total of 3500 students and 267 teachers. Despite the university's limited campus space , its students have many opportunities to participate in diverse extracurricular activities, including athletics, the arts, and cultural events. Currently, the administration has been taking every necessary step available to students to establish an optimal atmosphere for academic and research activities to be conducted smoothly and harmoniously. The existing, efficiently structured courses have been modified to align with the demands of the market (Siddik et al. 2023).

Data collection and process

A structured questionnaire was used to collect students' perceptions about the campus land use atPatuakhali Science and Technology University. The questionnaire was developed and designed to identify the most favourite and familiarzone of the campus, to explore students' perception on campus land use, and recommendations regarding further land use change.Two types of Likert scales were used in this study, including a 4-point scale, and a 3-point scale. For measuring the level of perception about campus areas, and

green-open-blue spaces, a 3-point Likert scale considering 0 for 'insufficient' 1 for 'moderate', and 2 for 'sufficient'. Another 4-point Likert scalewas used to express the satisfication level of different structures considering 0 for 'dissatisfied', 1 for 'less satisfied' 2 for 'moderate satisfied', and 3 for 'satisfied'(Table 1).

Table 1: Likert-type scale

Variables	Scale	Value
Three-point Likert scale:		
Perceptions about campus area and green-open-blue spaces	Insufficient	0
	Moderate	1
	Sufficient	2
Four-point Likert scale:		
Satisfactions about the location of different structures	Dissatisfied	0
	Less satisfied	1
	Moderate satisfied	2
	Satisfied	3

Source: Authors, 2024

A total of 280 students from seven faculties, 40 from each (20 male and 20 female) were randomly selected for an interview (Table 2). The interview session was conducted in Bangla, the native language of Bangladesh, and subsequently translated into English. Data verification at the desk was conducted throughout the initial phase. Upon survey completion, the data underwent a second and final level of verification by cross-checking. The collected field data has been analyzed and processed using the SPSS program (version 17.0) and MS Excel (version 10).

Table 2: Sample size distribution

Faculty	Male	Female	Total
Agriculture	20	20	40
Computer Science and Engineering	20	20	40
Business Administration	20	20	40
Fisheries	20	20	40
Environmental Science and Disaster Management	20	20	40
Nutrition and Food Science	20	20	40
Law and Land Administration	20	20	40
Total	140	140	280

Source: Author, 2024.

Ethical statement

This study conformed to all ethical norms specified in the Declaration of Helsinki and its subsequent amendments with regard to human participants. Prior to each interview, only verbal consent was acquired from the respondents. Furthermore, this activity received verbal authorization from the Department of Emergency Management at Patuakhali Science and Technology University, located in Patuakhali-8602, Bangladesh.

Results

Most favourite zone of the campus

A total of ten spots were identified as the most favouritezones in Patuakhali Science and Technology University, including playground, Paris road, Joy Bangla square, Nilkamol bridge, Bakul flower square, Martyr tower, Teacher-student centre (TSC), Palm tree square, Annex road, and Independence square. Figure 1 shows that most of the students identified playground (56%) as the most favourite zone of the campus. The percentage of preference among the students of different faculties varies, with the highest 85% by the students of the FCSE and the lowest 35% by the students of the FNFS. We further asked why students preferred playground as most favourite zone. About 48.7% respondents reported the reason for the preference as a meeting place. Besides, about 28.2% and 26.9% referred playground because they love to play and enjoy watching games there, respectively. In addition, about 26.9%, 19.2%, and 21.8% preferred playground as the most favourite zone because of its beauty, environment, and openness, respectively (Table 3).

The second most identified favourite zone was Paris road (43%). The percentage of Paris road preference also varies among the students, with the highest 65% by the students of the FNFS and the lowest 35% by the students of the FAG and FCSE (Figure 1). About 58.3% respondents reported that they mainly chose Paris road because of its environment. Besides, about 48.3% preferred Paris road as their meeting place and about 40.0% because of its beauty (Table 3).

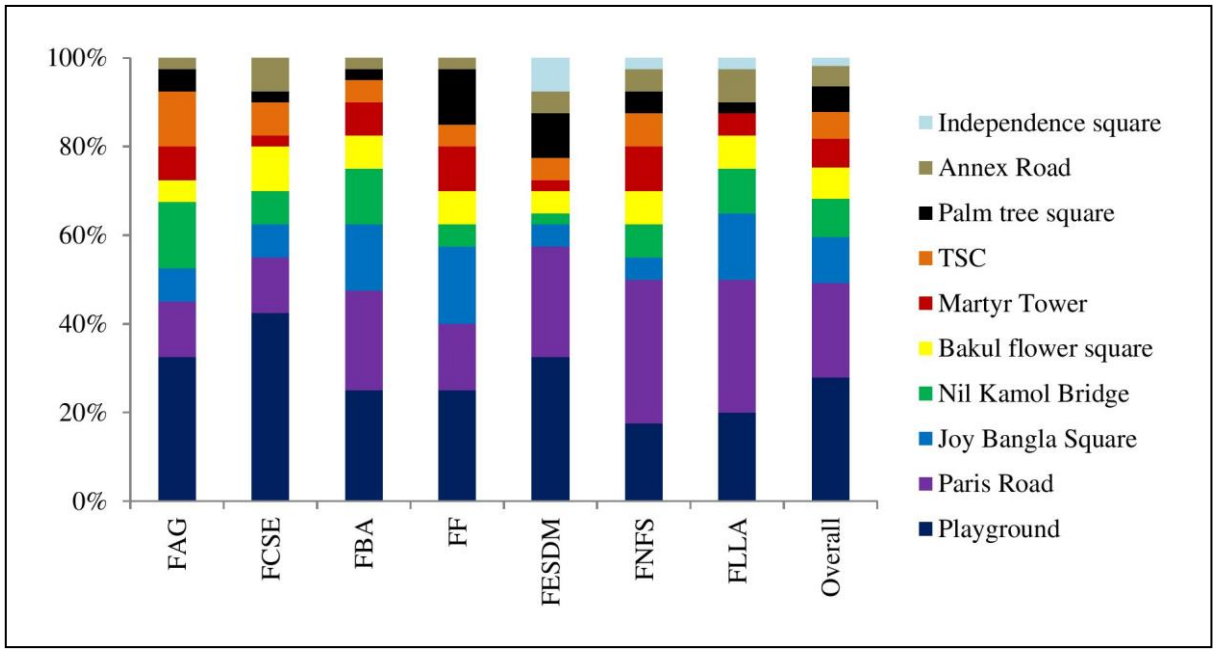

Figure 1: Faculty-wise and overall most familiar zone of the campus used by the students. Here, faculties are, FAG=faculty of agriculture, FBA=faculty of business administration, FCSE=faculty of computer science and engineering, FF=faculty of fisheries, FESDM=faculty of environmental science and disaster management, FNFS=faculty of nutrition and food science, and FLLA=faculty of law and land administration. Source: Field Survey, 2024

The third most favourite spot was Joy Bangla square (21%) and followed by Nilkamolbridge (17%), Bakul flower square (14%), Martyr tower (13%), TSC (12%), palm tree square (11%), Annex road (9%), and Independence square (4%). Overall, student mainly considered favourite spots because of their usage as meeting place (45%), beauty (38.6%), and environmental aspects (37.9%).

Table 3: Reasons of preference as most favourite spot of the campus (multi-responses)

Reasons of favourite	Favourite spot preference (%)										Overall (%)
	Playground	Paris road	Joy Bangla square	Nilkamol bridge	Bakul square	Martyr tower	TSC	Palm tree square	Annex road	Independence square	
N	78	60	29	24	20	18	17	16	13	5	280
Meeting	48.7	48.3	41.4	16.7	65.0	50.0	70.6	37.5	23.1	0.0	45.0
Beauty	26.9	40.0	48.3	87.5	35.0	22.2	11.8	25.0	46.2	100.0	38.6
Enjoy game	26.9	16.7	10.3	4.2	0.0	11.1	5.9	0.0	15.4	0.0	14.3
Environment	19.2	58.3	48.3	70.8	5.0	22.2	29.4	43.8	46.2	40.0	37.9
Gossiping	6.4	3.3	6.9	12.5	25.0	11.1	17.6	12.5	7.7	20.0	9.3
Love to play	28.2	13.3	10.3	4.2	20.0	11.1	5.9	6.3	7.7	20.0	15.7
Mass gathering	14.1	6.7	17.2	0.0	10.0	16.7	35.3	0.0	0.0	20.0	11.4
Monumental work	3.8	1.7	6.9	0.0	5.0	33.3	5.9	0.0	0.0	0.0	5.0
Openness	21.8	6.7	10.3	4.2	25.0	16.7	11.8	56.3	30.8	0.0	17.1
Peacefulness	3.8	5.0	0.0	0.0	10.0	5.6	5.9	18.8	23.1	0.0	5.7

Source: Field Survey, 2024

Perception about campus area and its green-open-blue spaces

Figure 2 shows that most of the students from different faculties reported that the area of the campus of PSTU was not sufficient. About 80% of FLLA students, 75% of FAG students, 60% of FESDM students, 50% of FCSE and FNFS students, 35% of FBA students, and 30% of FF students reported that the campus area is insufficient. Overall, more than half of the students reported aboutthe insufficient campus area of the PSTU.

In the case of green space on campus, overall, about 67.14% of students reported moderate perception, including a maximum of 85% reported by the students of FESDM, 70% by the students of FCSE and FBA, 65% by FNFS, and 60% by each of FAG, FF, and FLLA. Overall, about 16.43% of students reported insufficient green spaces, while the rest (16.43%) reported sufficient green spaces on campus (Figure 2).

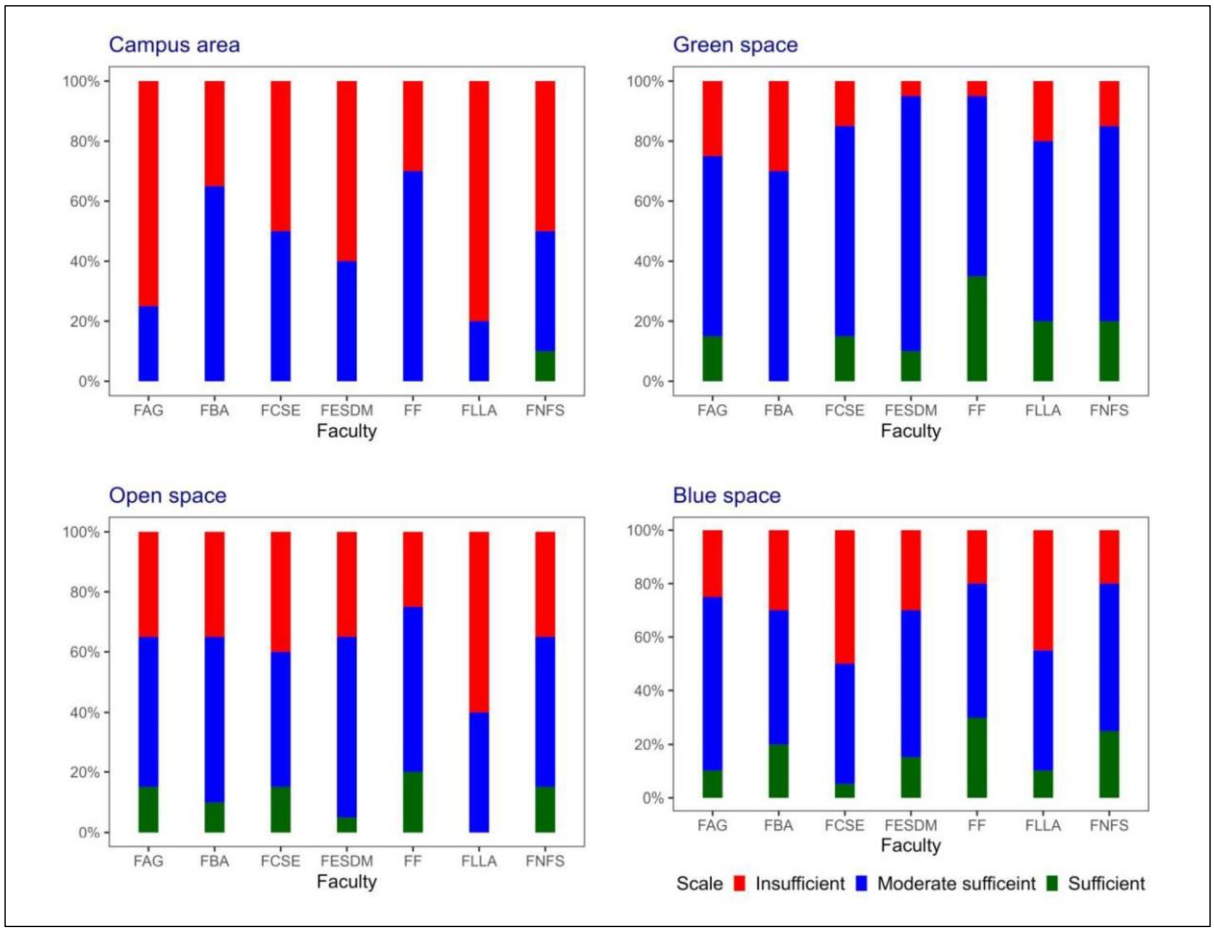

Figure 2: Faculty-wise perception about campus area, and green-open-blue space. Here, faculties are, FAG=faculty of agriculture, FBA=faculty of business administration, FCSE=faculty of computer science and engineering, FF=faculty of fisheries, FESDM=faculty of environmental science and disaster management, FNFS=faculty of nutrition and food science, and FLLA=faculty of law and land administration. Source: Field Survey, 2024

Regarding the availability of open space on campus, around 51% of students at PSTU reported moderate perception, including a maximum of 60% reported by the students of FESDM, 55% by the students of FF and FBA each, 50% by FAG and FNFS, 45% by FCSE, and 40% by FLLA. Overall, approximately 37.86% of students indicated a lack of adequate open spaces, while the remaining 11.43% reported having sufficient open places on campus (Figure 2).

In regard to the existence of blue space on campus, an estimated 52% of students enrolled at PSTU expressed a moderate perception. Among these students, 55% were reported by FAG students, 65% by FESDM and FNFS students, 50% by FBA and FF students, and 45% by FCSE and FLLA students. In general, an estimated 31.43% of students stated that there was an insufficiency of suitable blue spaces on campus, whereas 16.43% of students indicated that there were ample blue spaces available (Figure 2).

Perception about the location of academic building, TSC, and Library

Results show that most of the students from different faculties were not satisfied with the location of the academic building. Only 5-20% of students from the FBA, FCSE, FF, and FNFS were satisfied with the location of the academic building. Overall, only 5% of students at PSTU were satisfied. On the other hand, about 55% of FLLA students, 45% of FF students, 30% of FNFS students, 25% of FAG and FBA students, and 20% of FCSE and FESDM students were dissatisfied with the location of academic building. However,

mostly they were found to be moderately satisfied, and their overall moderate satisfaction level was about 37.1%. A maximum of 55% of students of FBA, 50% of students in FESDM and 45% of students in FAG and FCSE each were moderately satisfied (Figure 3).

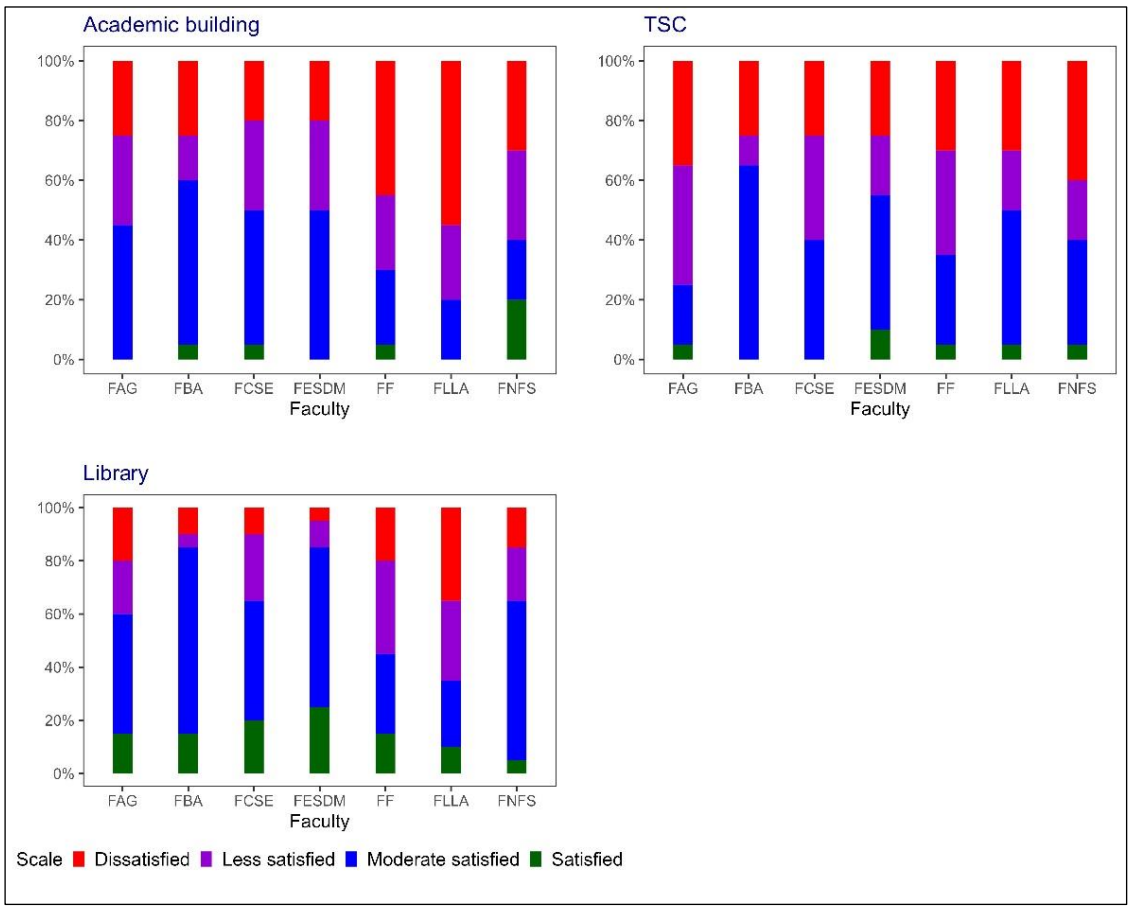

Figure 3: Faculty-wise level of satisfaction about the location of Academic building, TSC, and Library. Here, faculties are, FAG=faculty of agriculture, FBA=faculty of business administration, FCSE=faculty of computer science and engineering, FF=faculty of fisheries, FESDM=faculty of environmental science and disaster management, FNFS=faculty of nutrition and food science, and FLLA=faculty of law and land administration. Source: Field Survey, 2024

In the case of the location of the TSC, most of the students from different faculties were not satisfied. For instance, only 5% of students in FAG, FF, FLLA, and FNFS, as well as 10% of students in FESDM, were satisfied with the location of TSC. Overall, only 4.3% of students were satisfied. On the other hand, about 40% of FNFS students, 35% of FAG students, 30% of FLLA students, and 25% of FBA, FCSE, and FESDM students were dissatisfied with the location of TSC. Overall, about one-third of the students at the PSTU were dissatisfied. However, like the location of academic buildings, most of the students were found moderate to less satisfy with the location of TSC. Overall, about 40% and 25.7% of students was moderate to less satisfy. A maximum of 65% of students in FBA and 45% of students in FESDM and FLLA each were found to be moderately satisfied (Figure 3).

In the case of the location of the library, only 15% of the students at the PSTU were satisfied. Similarly, only 16.4% of students were dissatisfied with its location. However, overall, about 47.9% of students were moderately satisfied. Moderate satisfaction levels vary across the faculties, including 70% in FBA, 60% in FESDM and FNFS, 45% in FAG and FCSE each, 30% in FF, and 25% in FLLA (Figure 3).

Discussion

The objective of this study was to evaluate the students' viewpoint regarding the utilization of land on the campus of Patuakhali Science and Technology University in Bangladesh. Results revealed that 56% students identified playground as their most favourite spot followed by Paris road (43%), Joy Bangla square (21%), and other spots. Students mainly chose these places as the meeting places for sharing their views and ideas with each other's. They also consider the beauty and environment of the spots as criteria for identifying the most favourite places. Campus common area is a prominent category of space that plays an essential role in fostering a vibrant campus atmosphere.

Campus public space is a vital component to establish an active campus environment (Soares, Weitkamp, and Yamu 2020). Typically, the public areas in universities primarily serve as spaces for communication, education, sharing, social interaction, and leisure (Peker and Ataov 2019; Alves, Betrabet Gulwadi, and Nilsson 2022). University campuses should actively engage in environmental sustainability initiatives to enhance students' well-being and overall standard of life (Alves, Betrabet Gulwadi, and Nilsson 2022). Perceptions regarding the areas of campus and green-open-blue spaces were found insufficient. A notable number of students, for instance, about 54.3%, reported insufficient campus area. Similarly, about 37.9% and 31.4% reported insufficient spaces for open and blue areas on the campus, respectively. The utilization of open areas within the institution is linked to psychological well-being. It has a beneficial effect on reducing perceived stress and improving psychological recovery from diminished focus on learning (Stigsdotter and Grahn 2011).

The external surroundings and the physical setting have a significant impact on promoting the well-being of students, enhancing their mental health, facilitating attention restoration, and creating enjoyable learning experiences (Bratman, Hamilton, and Daily 2012; Afusi, Zarghami, and Mahdinejad 2014; IRENA 2017; Stephen Siu Yu Lau, Gou, and Liu 2014; Scholl and Betrabet Gulwadi 2015; McFarland, Waliczek, and Zajicek 2008). Moreover the proper and planned land use can also be effective during the disaster management process particularly rescue activities (Rahman, Moniruzzaman, and Akter 2018). The design and construction of open spaces significantly influence students' perceptions of their campus and have a crucial impact on their education (Farag, Badawi, and Doheim 2019). Studies demonstrate that a positive emotional state, characterized by happiness and contentment, contributes to the development of various aspects including psychological, physical, moral, and religious aspects (Afusi, Zarghami, and Mahdinejad 2014). In addition, the presence of appealing open areas enhances students' chances of enhancing their academic performance (Afusi, Zarghami, and Mahdinejad 2014). Additionally, the physical environment of an open space can also foster social interaction and encourage constructive activities, hence preventing feelings of isolation among learners (Pfeiffer and Cloutier 2016).

Results also revealed that only 16.4% reported insufficient green spaces. Most of them (83.6%) considered the campus have moderate to sufficient green spaces. Sugiyama et al. (2008) found a correlation between the feeling of greenness in the surrounding environment and both physical and mental well-being. Green areas boost the overall quality of built environments while also providing resistance to extreme weather (Siddik et al. 2022). The availability of green spaces has been found to be associated with psychological rejuvenation and enhanced health outcomes (Stigsdotter and Grahn 2011). According to Cohen et al. (2013) an adequate amount of green surroundings has a beneficial impact on an individual's overall sense of well-being. The presence of green spaces has a positive impact on both mental and physical well-being. It serves as a source of motivation for engaging in activities such as exercise and gardening (Coombes, Jones, and Hillsdon 2010; Pfeiffer and Cloutier 2016).

Results showed that only 5% of students at PSTU were satisfied with the location of the academic building. This satisfaction level was only 4.3% for the location of the TSC and 15% for the location of the library. In addition, the students also showed the moderately satisfied level of responses regarding these three buildings: academic (37.1%), TSC (40%), and library (47.9%). Sustainable campuses, on the other hand, are those that prioritize environmental preservation and actively work to integrate environmental science into all aspects of campus life (Sugiarto, Lee, and Huruta 2022) .

Conclusions and Suggestions

This study set out to assess the perspective of Patuakhali Science and Technology University students in Bangladesh on the use of campus land. The most favourite spots at Patuakhali Science and Technology University were ranked by the students of different faculties in order of preference as follows: playground, Paris road, Joy Bangla square, Nilkamolbridge, Bakul flower square, Martyr tower, TSC, Palm tree square, Annex road, and Independence square. These were the most popular meeting spots among the students. In deciding which places are the most favourite, they also take into account how beautiful,open, and attractive they are. Although a notable proportion of students perceived that the area of campus, and its open and blue space were not sufficient but most of them (83.6%) considered the campus have moderate to sufficient green spaces. However, only 5-15% students reported satisfactory level of perception regarding the location of academic building, TSC,and library.

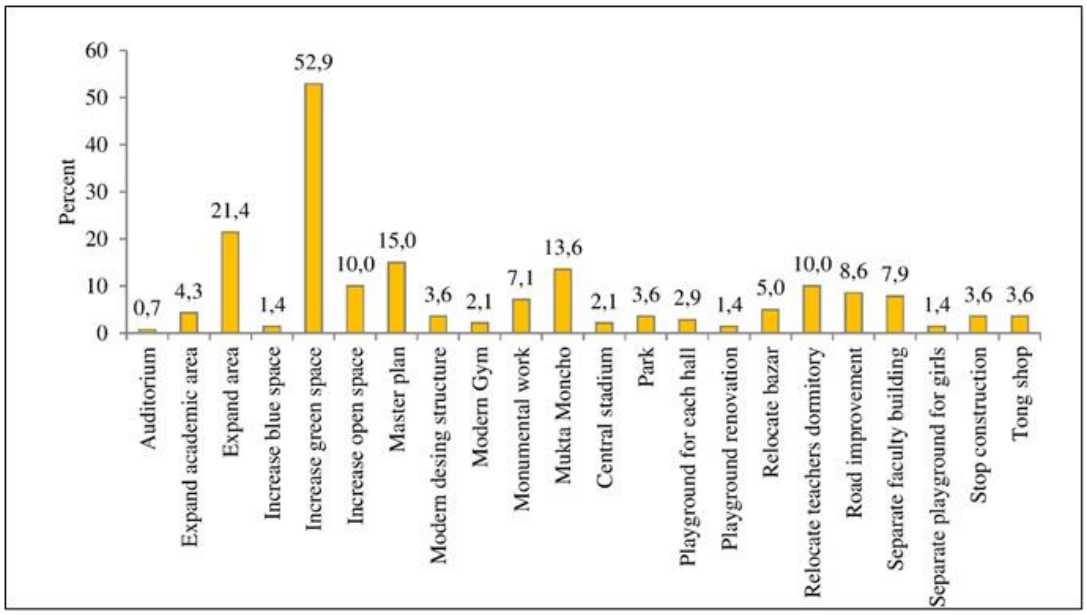

Figure 4. Recommendation about land use change provided by the students. Source: Field Survey, 2024

The results suggested changing the campus land use. Regarding the further campus land use change, a list of recommendations was provided by the sampled students from different faculties of Patuakhali Science and Technology University. Although most of the students reported sufficient green space in the campus, but during recommendations, they further suggested to increasethe area of green space (52.9%). They feel expanding green space can improve the visual attractiveness of the campus and offer ecological advantages. Expanding the main campus area by 21.4% may suggest the necessity for additional infrastructure or establishments in order to accommodate expansion or improving current amenities. Besides, *Mukto Moncho* **(**Public podium**)** holds considerable weight at 13.6%. In addition, students recommended that the university

should have a master plan for overall strengthening of the university (15%). They believe that developing a comprehensive master plan can ensure systematic and organized growth and development of the university. They also suggested relocating teachers' dormitory from the main campus, possibly to create more space or improve the overall layout. Subsequently, they also suggested improving road facilities, building separate infrastructure for each faculty, establishing monumental artwork, relocating bazaar areas, expanding academic areas, and so on (Figure 4).

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