

The Impact of Green Space Design on the Academic Performance of Students at Wasit University

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Received Nov. 29, 2025

Revised Dec.18, 2025

Accepted Jan. 17, 2026

Online Jun.1, 2026

ABSTRACT

The necessity to examine how the green spaces influence the academic performance at the university campus is important. It's one of the key components of offering a comfortable and challenging learning atmosphere that promotes creativity and good interaction at the universities. Although there are a few green spaces at Wasit university, their contributions towards the improvement of the learning environment and the academic performance of the students have not been well investigated. Case study research will be conducted on a number of colleges namely the Colleges of Engineering, Fine Arts, Education, Arts, and Administration and Economics. These colleges were chosen because they have different spatial distribution in Wasit University and the green spaces around these buildings are different in terms of their spatial distribution. Moreover, they are a number of different educational settings that include both scientific and humanities and it is a perfect chance to observe the correlation between the design features of green spaces and the degree of academic success in various study patterns. The research problem is that it questions the effectiveness of the planning and allocation of green spaces in these chosen colleges in the Wasit University, and whether the green spaces match the standards that would facilitate an improved. Moreover, the study will determine and assess the effectiveness of the design features and spatial density of the green spaces in the five colleges that have been selected to measure the effectiveness of the green spaces in stimulating learning, and increasing the sense of belonging to the college in question, to identify failures or gaps in the design of the green spaces. The study used a quantitative approach of analysis to check availability of the extent of green spaces according to standards. The results revealed, the scholarly effects and significance of green spaces at campus, that showed the necessity of having them based on the set standards. The researchers found, that the available green spaces in the chosen colleges, differed with the established standards. In conclusion, the study recommended, that each college implement design improvements, based on its findings and develop plans to enhance the efficient allocation of green spaces, to support the educational process.

Keywords: Green spaces, Academic performance, University campus, Social integration, Wasit University

1. Introduction

Over the past few decades, there has been a growing scholarly interest in how the university environment contributes, to enhancing the quality of life and academic performance of students. The university campus, is no more perceived as the educational territory, and is considered as a system that is built into the psychological, social, and cognitive well-being of students. Green spaces have become a key force that forms part of this system, and thus leads to the well-being of the students and their academic performance.

The research problem, is that it is doubting whether the design and distribution of green spaces are effective in these colleges, and whether they can be applied to the standards, which contribute to the support of the educational process and improvement of academic results. Although, there are a few green areas, their

contribution to enhancement of learning environment and the academic performance of the students has not been adequately researched.

The research will seek to establish the gap in the best standards of green space design in the university campus, and also offer a practical result on how to improve them in a manner that can be accommodative to the students and the nature of their learning work environment.

The study will also show, how green area design in the chosen colleges has affected the academic performance of the students in terms of design considerations and space distribution and examine the educational contributions that the green environment brought to the Wasit University campus.

The quality of the green space design in university campuses is positively related to the level of academic performance. Also, the indicators of academic performance are positively correlated with design characteristics, including accessibility to seating areas, shade, and pathway, among green spaces.

This research is significant, because it examines the effects of the design of the green spaces on the academic performance of students, considering that the allocation of such spaces to students in different colleges differs. The effective planning of the green spaces plays a vital role, as it has a positive influence on the academic success. The range of colleges in the Matthias College of Engineering, Science, Education, Arts, and Business and Economics offers a well-rounded learning experience, that includes both scientific and humanities courses, which allows taking advantage of the best chance to investigate the correlation between the design features of green space, and the degree of academic performance in various academic areas.

2. Material and methods

2.1. Research Methodology

Descriptive and quantitative analysis, was taken in this case since field measurements of the green areas, in the selected colleges were performed, and compared with the approved international and local standards in this aspect.

2.2. Scope of the Study

The case study was adopted at Wasit university, and five colleges were chosen, which included Engineering, Science, Education, Arts and Administration and Economics. The selection of these colleges was based on, the fact that they had different spatial distribution, the variation in distribution of the green spaces surrounding their buildings, and because they constitute a wide range of educational experience both in sciences and humanities. This is a perfect platform, to research the correlation between landscape features of green spaces and the educational achievement.

2.3. The Importance of Green Spaces on Campus of Use

According to several studies, the availability of the green spaces in the university campuses, helps to minimize stress levels and anxiety, as well as the feelings of belonging and satisfaction with the university life, which directly correlates with the academic performance [1].

"The advantages of green spaces, as explained by "Singh" are also seen not just in the aesthetic and environmental facets, but also in enhancing cognitive skills including concentration, creativity, and problem-solving capabilities, and also in training social interaction and promoting physical and mental well-being of students [2].

Research also indicates that inclusion of green areas within the campus not only improves psychological health and opportunity in social interaction, but also plays an environmental role in minimizing pollution and improving the quality of air [3].

This literature ascertains that the longer the period students are spending in green spaces of universities, the greater the degree of satisfaction expressed towards the academic and social lives and show greater capabilities of handling the stresses of studying. Such spaces are also a stimulating learning environment, offerings of reflection and relaxation, and open up the informal learning experiences to enhance sustainability and environmental awareness.

2.4. Literature Review (Previous Studies on the Impact of Green Spaces on Academic Performance)

2.4.1. Selecting In a recent Study by Javaid & Shabbir (2024) titled "Impact of Green Spaces on the Mental Health and Academic Achievements of College Students in Lahore, Pakistan,"

The quantitative and qualitative measures, of the effect of green spaces on college campuses regarding student mental health and academic performance, were measured through mixed-methods approach. The five colleges in Lahore were sampled, the data examined with the help of questionnaires, statistical tests, e.g., chi-square test, and spatial analysis by means of Geographic Information Systems (GIS) software, the results of which indicate, that students studying in the colleges in which green spaces, are available reached lower levels of stress and depression and better academic grades as compared to their peers studying in the colleges where green spaces were not available. The research also, revealed that green spaces are associated with social interactions, comfortable working conditions, and the well-being of the mind, which has a beneficial effect on academic performance.

The results highlighted, the need to plan cities and maintain green areas in schools as one of the ways to enhance, the academic and psychological health of students [4].

2.4.2. In a similar vein, a study conducted in Nigeria by Abimbola and Agboola (2023)

Established a positive relationship, that green infrastructure on campus of a university such as gardens, lawns and trees plays, a major role in enhancing the well being and academic performance of the students. The methodology used by the researchers in this study, was descriptive in a quantitative research design which involved, quantitative questionnaires to a sample of 398 students. The findings revealed that, accessibility to these green spaces has a reduction in stress levels, as well as improves the quality of the learning environment. Another finding of the study, was that the positive effect of the green spaces can also be enhanced through the better design and maintenance [5].

2.4.3. In South America, a Study by Craig & Da Silva

Perception of green spaces in the campus, among the examined university students in Guyana [6]. The research applied a field survey probability sampling technique, involving fifty students and reached the conclusion that most of the students are aware of the importance of these spaces and frequent them to relax and as a social interaction space, whereas male students tended to use them as a sports venue.

2.4.4. At the Level of General Education

Came to similar findings, because they focused on the correlation between vegetation cover indicators (NDVI), around schools and student performance in standardized testing [7]. The research was based on, a lot of quantitative statistics on the national scope and found out that schools, where there are more green spaces report positive academic outcomes, especially in mathematics and reading. This was explained by the study which proposed that natural environment helps in alleviating psychological stress, enhancing attention and improving the overall health of the students and therefore, the need to invest in the green infrastructure in schools.

2.4.5. In a Study Conducted in Santiago, Chile, involving 281,695 students.

Determined that the vegetation cover of educational institutions ,was strongly correlated with higher student test scores[8], indicating that the role of green spaces in alleviating educational and environmental gaps in cities.

2.4.6. A Study Conducted in the Federal District of Brazil

gave substantial scientific support, with over 344,000 students, and demonstrated that a greater degree of exposure to green spaces [9], be it in terms of vegetation density, proximity or area, is linked with an observable change in academic performance.

The present studies are united by the fact that green spaces, directly affect the mental well-being/attention of students, as well as their health, and, furthermore, have a positive effect on performance. They also indicate the existence of a vast gap in knowledge on the necessity to research this relationship within other geographical and cultural settings, and the necessity to broaden the emphasis on the social aspect that these spaces offer as the communication and interaction space among students.

2.5. Successful Global Experiences on the Impact of Green Spaces on Academic Pperformance

2.5.1. University of Witwatersrand

University of the Witwatersrand (Wits) in Johannesburg, South Africa is one of the top academic institutions in the continent of Africa. It has a history that goes to its establishment of the School of Mines in 1896 which slowly became a full-fledged university in 1922. Its spatial and academic growth during the decades has added to forming a particular urban identity in the city of Johannesburg, and its campus can be viewed as an example of the relationship between the educational space and the built environment. The strategic positioning of the university is in the middle of the city, which together with the diversity of the open and built spaces within the university has provided both an educational and social ecosystem which provides high academic achievement as well as the provision of green spaces and the public amenities which makes the university life more enjoyable. Thus, the University of the Witwatersrand can be considered as one of the significant case studies in the sphere of positive urban spaces since the example shows that balanced urban planning may contribute to both social integration and academic practices.

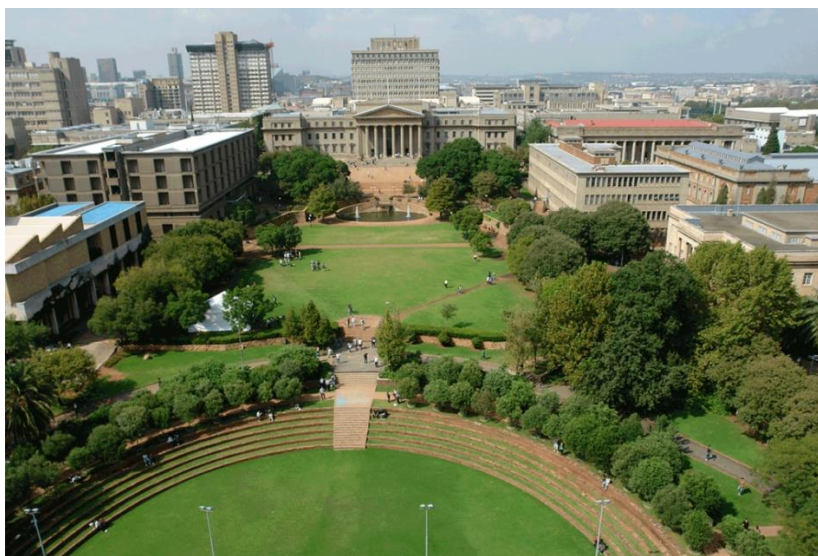


Figure 1. University of Witwatersrand [10] .

In a field study, Terblanche and Khumalo (2024) were able to evaluate the effect of biophilic design on student productivity in a university environment [11]. The research involved five areas of study, and the methodology it adopted was the use of a questionnaire filled by 45 students (10 students per area), and these students responded to open-ended and closed-ended questions regarding their perceptions, preferences, and sense of productivity in these spaces. Biophilic design is based on incorporating the elements of nature into the built environment, natural light, plants, and water as well as natural materials to achieve psychological well-being, lower stress levels, and improve cognitive skills and academic performance. The findings revealed that the Old John Moffat Foyer and the Chamber of Mines had high percentages of incorporating the biophilic design elements (80-85%), hence they were the most preferred choice of students because they gave them a feeling of comfort and refreshing.

However, the Wartenweiler and William Cullen libraries were rated low (29-36%), and students reported feeling anxiety and less productive because of the lack of natural elements. Participants affirmed that the availability of natural light, good ventilation and greenery directly led to unwinding of stress levels and the quality of concentration and the absence of these factors in other areas rendered them to be psychologically stressful places. The research concluded that the element of biophilia applied in the designing of university spaces is a very important criterion of boosting academic performance and student productivity. The students expressed a strong interest in areas that were abundant with natural elements due to the calmness and concentration. Nonetheless, the authors stressed that it would be important to balance the inclusion of natural components and the maintenance of other aspects like tranquility and noise levels.

2.5.2. Guru Ghasidas University in India

Guru Ghasidas Vishwavidyalaya (GGV), is a renowned university in India, which was originally founded as a state university in 1983 and subsequently promoted to a central university by an Indian parliament Act in 2009. The university is named after the 17th -century social reformer and saint, Guru Ghasidas, because he helped to

bring the marginalized groups nearer to the mainstream society and denounce social injustice. The university campus is situated at Bilaspur over an extensive green land of about 655 acres with the Arpa River bordering it and this gives the campus a unique green and environmental touch. The university has over 29 teaching departments, which are being expanded, in a wide variety of areas including arts, humanities, social sciences, management, applied sciences, engineering, pharmacy, and modern technologies. It was selected as an effective international experiment as it was accredited as B+ by National Accreditation and Assessment Council (NAAC) and is an active member of the Association of Indian Universities and the Association of Commonwealth Universities [12].

According to a study by Chandra et al. (2022), Guru Ghasidas University was analyzed as an effective example of what urban space design has on the academic performance of students [13]. The research revealed that the campus has a good balance of buildings and open spaces and the layout of the building has integrated green cover as a key aspect of the structure of the urban design within the university. This can be seen in land use distribution which is 66.07 percent of all the total campus areas, water bodies occupy an area of about 10.64 percent, and the built up areas such as academic and administrative buildings, roads and sports facilities do not surpass 15.22 percent. This allocation demonstrates a strategic plan to develop a green campus university that is balanced in terms of the needs of educational infrastructures and maintenance of nature environment.

Regarding vegetation cover the study revealed that the campus has over 124,662 trees and 61 species of different plants. The natural species was dominated by *Acacia nilotica* (88.35) and *Butea monosperma* (10.04) whereas *Peltophorum ferrugineum* (17.31) and *Eucalyptus globulus* (13.69) were the most abundant cultivated species. The amount of carbon in the carbon stock of the trees was estimated as about 10,942 tons of carbon dioxide and this is a testament to the role of the university campus to help in the fight against climate change and reduction of carbon emissions. When it comes to the direct effects of these green spaces on students the researchers used a questionnaire which had 480 students of six various colleges. The findings revealed that the ability of green spaces to improve concentration and attention got the highest rating among students with the mean of 3.12 out of 4. They also reported that such spaces helped in decreasing psychological stress and tension particularly during examinations at a rate of 2.33 out of the 4, and enhance academic performance as rated at 2.10 out of 4. The students testified that the green environment makes the educational environment more attractive and comfortable than a campus which does not have a green environment.

The Guru Ghasidas University campus is well designed and sets a good example. It meets the environmental goals as it traps carbon dioxide, enhancing the air quality and reducing temperatures by one to two degrees Celsius with the surrounding city. It also attains educational goals through improvements in academic performance and student focus, psychological and social goals such as the decrease of stress and the improvement of the connection between students and university environment. Therefore, the GGU campus is one of the brightest examples of how the requirements of environmental sustainability and academic development can be reconciled, and the design of green urban spaces can be employed as the means of supporting the educational process.



Figure 2. Guru Ghasidas University [14].

3. Theory/calculation

3.1. Indicators derived from international experiences in the design and distribution of green spaces in universities

Green infrastructure is among the most popular fields, where recent research has been conducted as this solution plays an essential role in the quality of life improvement, and the psychological comfort of inhabitants. This issue has been researched in many cities of different countries of the world, showing that the availability of green spaces directly leads to enhancement of the population health and social welfare.

Past researches and real life cases, reported in this area at university campus level evidently testify, to the relevance of green infrastructure and their immense contribution to the academic performance of students. Green spaces are connected with the establishment of healthy and engaging learning environment that is conducive to concentration and ideas. In this case thus, there will be a need to quantify the green areas in the University of Wasit campus, and compare them with international standards, Arab standards, and local standards, to ascertain the degree of their adherence to these standards, and the direct effect of the same in enhancing the environment in the university.

The effects of the green spaces on the level of academics will be ascertained by quantifying a series of indices, such as:

The indicator: The area of green space per college: actions

The proportion of urban green space per capita, across the world, is disparate as it depends on both population density and the city under analysis. The per capita share ranges between 6 and 15 square meters in the European cities, whereas the world health organization has established a standard of between 9 and 50 square meters per person [15]. In hot regions located in South Africa and Southeast Europe, the average was approximately 2.5 square meters of public parks per person, in addition to 1.5 square meters of playgrounds, bringing the total per capita share to 3.5 square meters. Some Western studies have indicated that open green spaces can reach 3 square meters per person, while the Iraqi Regional Planning Authority in 1977 recommended a range of 3.5 to 4.5 square meters per person[16]. Locally, a study by researcher Sawsan Sabih Hamdan in (2017) indicates that the required area of green spaces ranges from 2 to 10 square meters per person[17], while the Baghdad Municipality has set the per capita share of green spaces at 5 square meters. This latter standard is considered the clearest and most suitable for application in the local context[18].

Regarding similar examples studied, the standard for India recommends providing 10-12 square meters of green spaces per person[18]. Based on the foregoing, the Baghdad Municipality standard (5 square meters) will be adopted as a local standard, along with the minimum standard of the World Health Organization (9 square meters) as values for study and comparison to assess the extent to which green spaces in these colleges meet local and international standards. This is aimed at linking the results to the expected impact on students' academic performance, whether positive or negative.

3.2. About the university:

Wasit University is one of the modern Iraqi public universities, established on January 13, 2003, in the city of Al-Kut, the capital of Wasit Governorate. Its establishment came in response to the need of the governorate's residents for a higher education institution that would contribute to the dissemination of knowledge and culture and fulfill the academic aspirations of the local community.

- A. The university began with three colleges that were administratively and academically affiliated with Al-Qadisiyah University: the College of Education, the College of Administration and Economics, and the College of Science. The university has experienced massive growth over the years and today it has 15 colleges in different fields of science and humanities besides 55 academic departments (uowasit.edu.iq).

The Wasit University campus is about 3,000 dunams in the city of Al-Kut, and it is in a strategic location which is linked to the main road network of the city. There are college buildings, laboratories, libraries, sports facilities and student dormitories within the campus and this offers a complete educational environment to the students. There are a simulated number of 24,931 undergraduate students, and a more than 967 number of faculty members in this university.

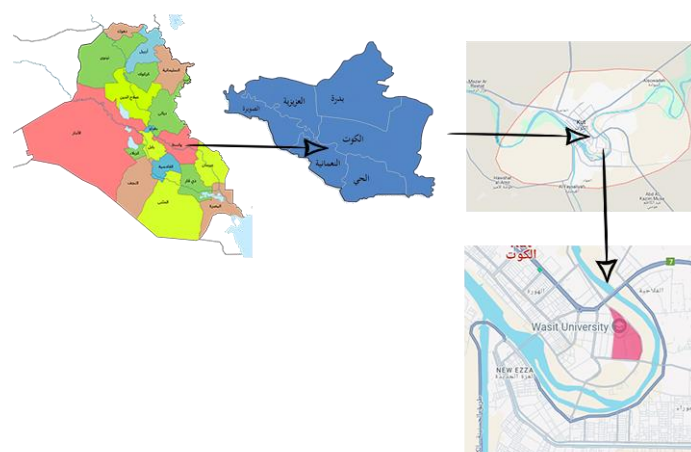


Figure 3. From left to right: 1- Iraq Map showing the Wasit Governorate, 2-Map of Wasit Governorate, 3- The boundaries of the city of Kut, 4- The boundaries of the study area.

3.3. Selected areas in Wasit University:

In this research, we shall explore five colleges namely the Colleges of Engineering, Fine Arts, Education, Arts and Administration and Economics, which are located on the four axes of the university campus. This choice of colleges will make sure that the selected models are representative of various points of the campus as illustrated in the image.

The college of education is on the northern part of the campus, college of engineering is on the southern part and college of administration and economics on the eastern part. The western side of the campus is taken by the College of Arts and the College of Fine Arts is located in the middle of the campus. This spatial distribution of the colleges gives it spatial diversity and allows one to study in a holistic way about different sections of the university campus. The difference in the space each college received, as well as the number of enrolled students, also contributes to more diversity of data concerning studying the effects of green spaces on academic achievements.

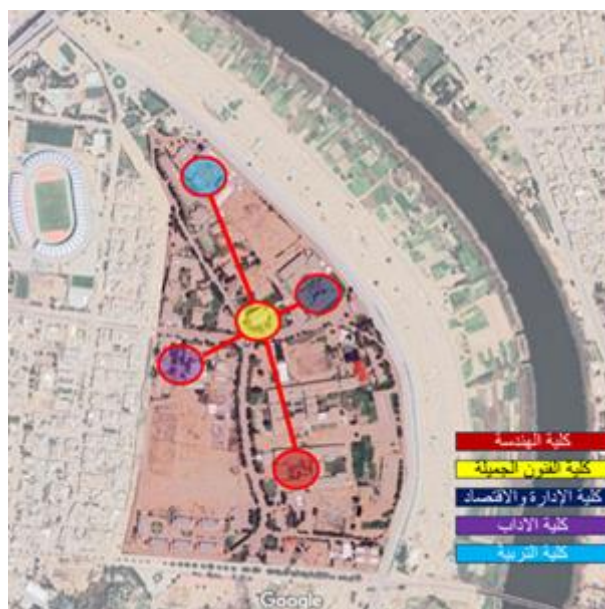


Figure 4. The Location of the Five Colleges in the Master Plan of Wasit University.

The College of engineering and the front garden occupy an area of around 12,000 square meters, with green areas occupying an area of around 3,000 square meters. Its total territory (including both the College of Education and its two branches: Humanities and Pure Sciences) is about 22,000 square meters, out of which 5,000 square meters of the territory is covered with green space, including the outer garden and the territory around the parking

lot of the college. The College of Administration and Economics covers approximately 6,000 square meters, with 2,500 square meters of green areas, distributed between 1,000 square meters of internal green space and 1,500 square meters of external green space surrounding the building in the form of a simple belt.

As for the College of Arts, its total area is approximately 10,000 square meters, of which 3,000 square meters are green areas. While the Faculty of Fine Arts is characterized by its small size due to the vertical, rather than horizontal, nature of its building, its area does not exceed 3,000 square meters, of which 2,000 square meters are dedicated to green spaces. In addition, the faculty is currently utilizing the space allocated for one of the academic buildings that has not yet been constructed, transforming it into a green area located on the northern side of the faculty. According to the official website of Wasit university[19] for the academic year 2021-2022:

Table 1. Number of Students and Number of Teaching Staff in the Five Colleges

College	No. of students	No. of teachers
Engineering	1141	113
Education for Pure Sciences	1530	55
Education for Humanities	3663	135
Fine Arts	578	18
Faculty of Arts	709	57
Administration and Economics	2712	89

4. Results

The results for the first indicator (green area) for each college were calculated using the following equation:

Required green area = Total number of individuals $\times$ Approved standard

Deficit or surplus = Available area – Required area

Coverage percentage (%) = (Available area $\div$ Required area) $\times$ 100

This indicator was used as a quantitative variable for comparison between colleges based on the available standard, as follows:

Table 2. Comparison with the Baghdad Municipality Standard (5 m²/person)

College	No. Of Stud	No Of Teach	Total	Available green space (m ²)	Required area (m ²)	Deficit/Surplus (m ²)	Coverage percentage (%)
Engineering	1141	113	1254	3000	6270	-3270	47.8 %
Pure +Sciences	5193	190	5383	5000	26915	-21915	18.6 %
Humanities							
Administration and Economics	2712	89	2801	2500	14005	-11505	17.9 %
Arts	709	57	766	3000	3830	-830	78.3 %
Fine Arts	578	18	596	2000	2980	-980	67.1 %

Table 3. Comparison with the World Health Organization Standard (9 m²/person)

College	No. of Stud	No of Teach	Total	Available green space (m ²)	Required area (m ²)
Engineering	1254	3000	11286	-8286	26.6

Pure Sciences+ Humanities	5383	5000	48447	-43447	10.3
Fine Arts	596	2000	5364	-3364	37.3
Arts	766	3000	6894	-3894	43.5
Administration and Economics	2801	2500	25209	-22709	9.9

5. Discussion

It can be seen through the above tables that:

5.1. College of Engineering

It has a population of 1254 and a green area of 3000 m².

Relative to the standards: It is within the 47.8% of Baghdad Municipality standard, 26.6 percent of the World Health Organization standard and 23.9% of the Indian standard.

Analysis: The green area is inadequate though it seems the green area is quite large given that there are too many students in the same area meaning that the college should at least increase the size of its green areas to accommodate the minimum requirements.



Figure 5. College of Engineering.

5.2. College of Education for Sciences (Humanities and Pure Sciences)

It consists of 5383 people, and the green areas are 5000 m².

The rate of coverage is not more than 18.6 percent of the standard of Baghdad Municipality and even lowers to 10.3% by the World Health Organization and 9.3% by the Indian standard.

Result: The College has a considerable under-quota, because it requires in excess of 21,915 m² of extra green space to attain the local minimum. The disproportion in the number of people and the green spaces makes the college one of the weakest colleges in this aspect.



Figure 6. College of Education for Sciences

5.3. College of Fine Arts

The population size is 596 people and the area of green space is 2000 m².

It satisfies 67.1% of Baghdad standard, 37.3% of World Health Organization standard and 33.6% of the Indian standard.

Analysis: The college is comparatively superior to other colleges as it has fewer students in addition to using areas of unused land and turning it into green areas, however, it still has to multiply its green areas to have complete cover.



Figure 7. College of Fine Arts.

5.4. Faculty of Arts

It has a total of 766 people, and a green area of 3000 m².

It gets the highest percentage of the faculties: 78.3% of the Baghdad standard, 43.5% of the WHO standard, and 39.2% of the Indian standard.

Analysis: The faculty is deemed to be nearest to international standards, as there is a balance between the number of students and the green areas. Nonetheless, it requires an extra 4000 m² to get satisfactory.



Figure 8. Faculty of Arts.

5.5. Faculty of Administration and Economics

It consists of 2801 people, and there is merely 2500 m² of green area accessible.

The rate of coverage is extremely small: 17.8 in Baghdad, 9.9 in the WHO, and 8.9 in India.

Analysis: The high amount of students means that the faculty has a serious deficit of more green space (around 23-25,000 m².), which makes it one of the faculties that have the biggest shortfall in terms of environmental Material and methods.



Figure 9. Faculty of Administration and Economics.

6. Conclusions

As a result of the distribution of the green spaces presented in the colleges of the university, several scientific conclusions can be made. Coupled with the fact that they indicate the environmental equilibrium as well as the adherence to the local and international planning standards, these conclusions also expose weak spots in the structural organization of campuses, as well as environmental management. According to the findings, the first observation is that there is a very evident imbalance of numbers of students and green space in most of the colleges. None of the colleges was completely sufficient based on the criteria of Baghdad Municipality, the World Health Organization, or the Indian standard. This is an issue of structure that is not limited to a few individual cases of a specific college. This disparity is specifically reflected in colleges where the number of students is large like the College of Education of Science and the College of Administration and Economics. The rise in student population has not been accompanied by a commensurate growth in green areas and this has caused a drastic drop in the coverage rates that are approaching below 10 percent of international standards.

An intermediate situation occurs in the College of Engineering. It boasts of a fairly high absolute amount of green space, but the high student density has diminished its environmental performance. This implies that it is not possible to assess the green spaces by considering their total area but directly proportional to number of real users. The findings show that even at this college the minimum acceptable environmentally friendly level can only be reached when the existing green space is at least doubled and this is the sign of insufficiency in the future planning to facilitate the growth of academic activities. However, the Colleges of Arts and Fine Arts are doing a comparatively better job than the other colleges. This is majorly due to the reduced number of students and not high efficiency in the field of environmental planning itself. An example of this is the college of fine arts who made the use of the unused land and turned it into a green area thereby expanding its coverage though it is yet to be fully satisfied. The College of Arts recorded the best coverage in comparison with the other colleges being studied, which shows that there is a relative balance between the number of students and the amount of space available, yet it is still not as high as international standards. This confirms that even the most successful instances in the university campuses have structural design flaws in ensuring that they have green space. Evaluation of the three standards (Baghdad Municipality, World Health Organization, and the Indian standard) shows that gaps are increasing in the direction towards the stricter international standards wherein the level of compliance is declining substantially. This portrays how global health and environmental standards are not well embraced in the local university planning meaning that the use of local minimum standards alone might not be adequate in ensuring that the learning environment is healthy and sustainable. Thus, one can assume that the underlying issue is not only the absence of the green spaces, but also the absence of the overall planning

vision that would connect the development of students with the development of the environment and implement clear and usable standards of all colleges. The results verify that the further existence of this gap may have harmful consequences on the quality of the university environment and the psychological and social well-being of students, undermining the capacity of the campus to serve as the environment of social integration and environmental sustainability. It requires a more holistic and greener re-evaluation of the future campus planning and development policies.

7. Acknowledgment

I would like to offer my deepest gratitude and appreciation to the deans of the Faculties of Engineering, Business and Economics, Arts and Humanities and Education who have helped me to accomplish this research. I also would like to say goodbye to my supervisor and thank him as he has made a good contribution to the research.

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