

Quantifying the Impact of Campus Green Spaces on Student Well-being and Academic Performance: A Multi-Dimensional Analysis

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Abstract: *The University campus's general sustainability and environmental quality are greatly improved by the presence of green spaces. Their influence on students' academic achievement and well-being, however, is still little understood and frequently ignored. This study explores multiple aspects of the relationship between green environments and student outcomes to objectively evaluate the complex effects of campus green spaces on academic achievement and student well-being.*

It has long been acknowledged that green spaces are essential to sustainable construction in colleges and universities. It still needs to be fully studied to understand their impact on student's academic achievement and well-being. This study measures the impact of campus green areas on student outcomes using a thorough, multi-dimensional analysis.

There are several methods, including campus sustainability initiatives, internships and experiential learning, community engagement, and research projects, that can be used to link academic success with sustainability.

We investigate the complex relationship between green spaces and different aspects of student life using a combination of quantitative data and qualitative judgments. The following aspects of sustainability are covered in this study: social interaction, mental health, physical health, and cognitive function:

Physical well-being: Access to good food sources, open spaces, clean water, and air is at the heart of sustainable living, and all of these factors contribute to better physical health outcomes.

Mental well-being: Spending time outside, in green spaces, and connecting with nature can all benefit mental health by lowering stress, anxiety, and depression.

Cognitive function: Sustainable techniques, such as energy saving, trash reduction, and green building design, help to create healthy indoor environments. These routines benefit cognitive function by increasing concentration, creativity, and problem-solving abilities.

Social interaction: Living sustainably encourages participation in the community, cooperation, and cooperative efforts to address environmental challenges. The foundation of sustainable living is having access to safe food sources, green spaces, and clean air and water.

We explore how green areas can improve mental state, reduce stress, and encourage students to be happier and healthier. Our study highlights the collective value of green areas as platforms for environmental education, community involvement, and social interaction, in addition to their benefits. We probe into their capacity to cultivate a sense of belonging, foster ecological literacy, and promote sustainable behaviours among campus residents.

This multi-dimensional analysis attempts to provide a comprehensive understanding of the effect of campus green spaces on student well-being and academic achievement by synthesizing empirical evidence and theoretical concepts. our research provides insightful information for administrators, instructors, and campus planners who want to use green infrastructure to promote healthier, more encouraging learning environments

Keywords: Mental Well-being, Green Infrastructure, Sustainable behaviours, Social interaction, Ecological literacy

I. INTRODUCTION

The importance of green spaces on campuses has drawn more and more attention in recent years from academics, administrators, and urban planners. Natural components have a significant impact on students' academic performance and overall well-being, making them valuable additions to educational environments beyond just aesthetic considerations. Re-establishing a connection with the environment in educational settings is crucial given how quickly urbanization and technology progress are changing the modern world. It explores the complex interactions between human experiences and environmental elements to clarify the significant effects of green spaces in educational settings.

The intrinsic relationship between human health and nature has been brought to light by the emerging science of environmental psychology. Reduction of stress, enhancement of emotional well-being, and increased cognitive function have all been linked to green space exposure. The incorporation of greenery provides a comprehensive approach to student welfare in the setting of educational institutions, where stress and academic expectations frequently predominate. Nevertheless, research and empirical examination are still needed to determine the precise mechanisms by which green spaces affect academic achievement and overall well-being.

Furthermore, the importance of green spaces goes beyond personal health to include more general educational goals. Studies indicate that being in a natural setting promotes creativity, focus, and general cognitive growth, which may improve academic performance. Campus environments with green spaces could be a catalyst for a positive learning atmosphere that encourages intellectual curiosity and academic engagement.

However, there are many contextual elements, including design, accessibility, and cultural attitudes, that affect how green spaces affect student achievement. This study uses a multi-dimensional analytical framework to try and make sense of this intricacy. It seeks to clarify the various facets of the connection between green spaces and student well-being by combining quantitative measurements, qualitative evaluations, and spatial analytic methods.

In doing so, this research contributes to both theoretical understanding and practical applications within educational settings. Insights derived from this study hold the potential to inform campus planning strategies, curriculum development initiatives, and student support services. By recognizing the pivotal role of green environments in nurturing holistic student development, educational institutions can strive towards creating inclusive, sustainable, and thriving learning ecosystems.

This research paper is structured to provide a comprehensive exploration of the topic. It begins by reviewing existing literature on the relationship between green spaces and human well-being, drawing insights from disciplines such as environmental psychology, public health, and urban planning. Building upon this foundation, the paper then examines the specific context of college campuses, considering factors such as campus size, layout, and socio-cultural dynamics that may influence the perceived benefits of green spaces.

By adopting a multi-dimensional framework, this study aims to address the complexities surrounding the impact of campus green spaces on student outcomes. Rather than focusing solely on academic metrics, such as grades and retention rates, this research considers broader dimensions of student well-being, encompassing aspects like mental health, social connectedness, and overall quality of life.

II. LITERATURE REVIEW

ⁱ (Andrews, B. (2014). a study "Quantifying the Well-Being Benefits of Urban Green Space" the Researcher highlights the complexity of assessing the value of urban green spaces, acknowledging the contributions of both economic and psychological perspectives while underscoring the need to integrate spatial dynamics. The thesis proposes integrating spatial considerations into economic and psychological assessments to better understand the benefits of these spaces. Despite challenges, such an approach offers insights into individual well-being and supports a holistic framework for policy-making focused on societal well-being rather than GDP growth. In the end, incorporating spatial dynamics enhances our understanding of urban green spaces' true value and their role in improving societal well-being.

ⁱⁱ (Hong, Lee, Jo, , & Yoo, , (2019).)The significance of urban green spaces in urban environments is emphasized in the study "Impact of Frequency of Visits and Time Spent in Urban Green Space on Subjective Well-Being," which also provides helpful suggestions for policymakers and urban planners on how to give priority to the creation and accessibility of green spaces to improve the well-being of city dwellers. The findings showed the beneficial effects of motivation and the adverse effects of access time and constraints on the frequency of visits to urban green spaces,

indicating that improving walking environments and urban green space accessibility are essential first steps towards raising the subjective well-being of urban dwellers.

ⁱⁱⁱ(Balram, & Dragičević, , (2005))the study ‘Attitudes toward urban green spaces: integrating questionnaire survey and collaborativetechniques to improve attitude measurements “conducted in West Island, Montreal, Canada, aimed to develop a comprehensive instrument for measuring citizen attitudes toward urban green space, the research successfully operationalized the concept of attitudes and shed light on the multi-dimensional nature of attitudes towards urban green spaces. The result revealed valuable insights into how different dimensions of attitudes can affect decision-making processes related to the design, development, and maintenance of urban green spaces. By considering diverse perspectives and addressing the identified factors influencing attitudes, urban planners can better cater to the needs and preferences of citizens, thereby enhancing the overall quality of urban green spaces and their contribution to community well-being and environmental sustainability.

^{iv}(Addas, A., & Goldblatt,, (2021).)In thestudy Public Open Spaces Evaluation Using Importance-Performance Analysis (IPA) in Saudi Universities: The Case of King Abdulaziz University, Jeddah, the study focuses on examining the significance and effectiveness of public open spaces (POSs) at King Abdulaziz University (KAU) campus in Jeddah, the findings underscore the necessity of understanding and prioritizing Public open spaces to enhance management and promote environmental sustainability locally. Additionally, the study suggests integrating the role of POSs in education, recreation, and environmental conservation into campus planning decisions.

(Rouse, & Fantuzzo,, (2009))^vThe study Multiple Risks and Educational: A Population-based Investigation of Threats to Early School Success, utilized a developmental-epidemiological approach to investigate the prevalence and effects of various risks on educational outcomes among all second-grade students in a low-income, urban public school system. The study underscores the need for increased collaboration between early childhood educators and public service systems like child welfare and homelessness services. To enhance the educational well-being of at-risk young children, intentional, systematic, and comprehensive interventions are imperative, world levels, taking into account mediating elements such as self-esteem and resilience, may be created.achievable only through such interdisciplinary collaboration.

(Nartova-, & ,& Donat, , (2019).) In the study Subjective well-being in a just-world perspective: A multidimensional approach in a student sample demonstrated the importance of personal belief in a just world as a psychological resource for undergraduate students, emphasizing its link to numerous dimensions of subjective well-being. While earlier studieshave given mixed evidence about cultural distinctiveness, our findings show that personal belief in a just world plays an adaptive role in the lives of Russian university students. This offers possible uses in counselling and psychotherapy, where approaches for increasing personal belief in just world levels, taking into account mediating elements such as self-esteem and resilience, may be created.

^{vi}(Soutter, , O'Steen, && Gilmore,, (2014).)The study The Student Well-being Model: A Conceptual Framework for the Development of Student Well-being Indicators, The Student Well-being Model consists of seven domains and three categories, which emerged from the analysis of various sources. It facilitates reflection, communication, and enactment of student well-being, considering the interrelationships among different domains. This model is seen as a valuable tool for educators, researchers, and policymakers seeking to promote student well-being in schools. It complements existing approaches by incorporating broader dimensions beyond cognitive or health-related indicators. By emphasizing the importance of student well-being in education research, practice, assessment, and policy, the Student Well-being Model underscores the notion that fostering well-being is fundamental to the educational experience and the overall development of young individuals.

OBJECTIVES OF RESEARCH

- The primary objective of the research is to explore the Impact of Campus Green Spaces on Student Well-being and Academic Performance: A Multi-dimensional Analysis. The research aims to studythe impact of campus green areas on academic achievement and student well-being using a multi-dimensional analysis.
- To measure the impact of campus green areas on academic achievement and student well-being using a multi-dimensional analysis.

- To clarify the significant effects of green spaces in educational environments, it explores the complex interactions between environmental elements and human experiences.
- To aim to deepen our comprehension of the transformative potential that comes with incorporating nature into educational settings by revealing the complex dynamics at work.
- To explore potential moderating variables that could influence the relationship between campus green spaces and student outcomes, such as socio-economic background, cultural differences, academic major, and level of campus involvement.

Hypothesis

A research hypothesis is an idea for something that is based on known facts but has not yet been proven. It is a statement that provides an explanation for how something works based on facts.

The following hypothesis is set to the Impact of Campus Green Spaces on Student Well-being and Academic Performance.

H1: Campus Green Spaces has a significant Impact on Student Well-being and Academic Performance.

H2: There is a significant impact of the correlation between environmental elements and human experiences. **H3:** There is a significant impact on comprehension of the transformative potential that comes with incorporating nature into educational settings by revealing the complex dynamics at work.

H4: There is a significant impact on the relationship between campus green spaces and student outcomes, such as socio-economic background, cultural differences, academic major, and level of campus involvement.

LIMITATIONS OF RESEARCH

The limitations of the research will be as follows:

1. The research will be limited to the respondents of Indore city. This will further help other researchers to conduct a study for other cities.
2. The research will be limited to Green Spaces on Campus. This will allow further research on other environmental issues.
3. The research will cover only 200 respondents from Indore City for the study.

II. DATA ANALYSIS AND INTERROGATION

Demographic profile of the respondents

Category	Respondent
Male	80
Female	120
Total	200

Table 1. The gender profile of the respondents

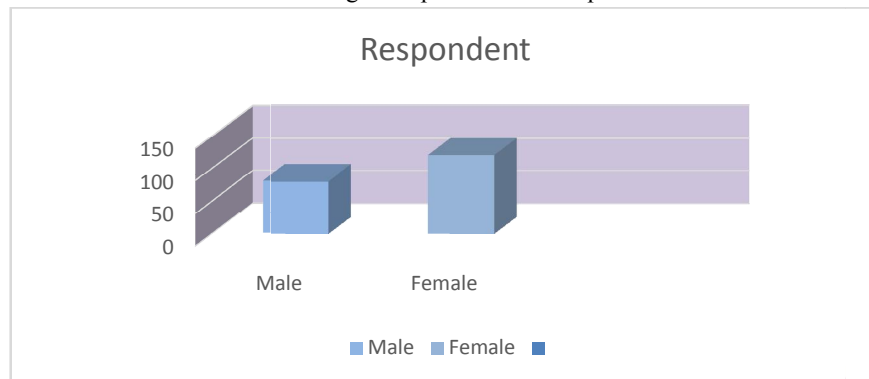


Table 1.1 The gender profile of the respondents.

Interpretation

This Table shows showing no. of gender respondents in the questionnaire Quantifying the Impact of Campus Green Spaces on Student Well-being and Academic Performance: A Multi-dimensional Analysis. The total no. of the respondent was 200 of which 120 were female and 80 were male respondents.

2. How often do you visit campus green spaces?

Category	% Respondent
Regular	73%
while a week	18%
Never Visited	9%

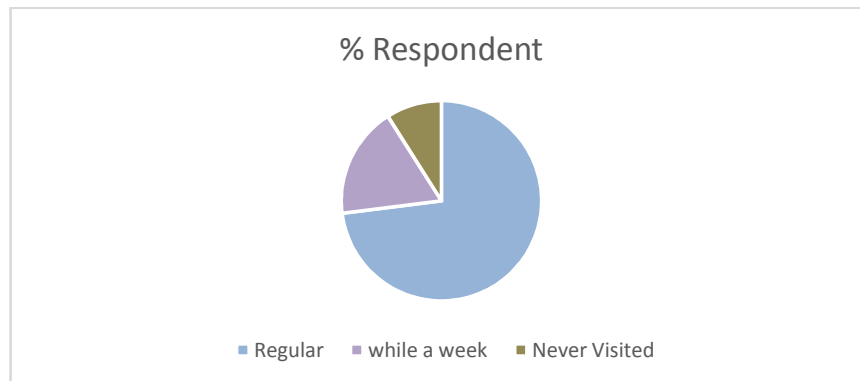


Table: 1.2 How often do you visit campus green spaces.

Interpretation

This Table shows the Percentage of respondents How often do you visit campus green spaces? we found that 73% of respondents are those who used to visit daily and 18% of respondents are those who once a week visit the green campus and the remaining 9% of respondents never visit campus green areas.

3. Do you feel that green spaces contribute to your overall well-being?

Category	% Respondent
Yes	95.7%
No	4.3%

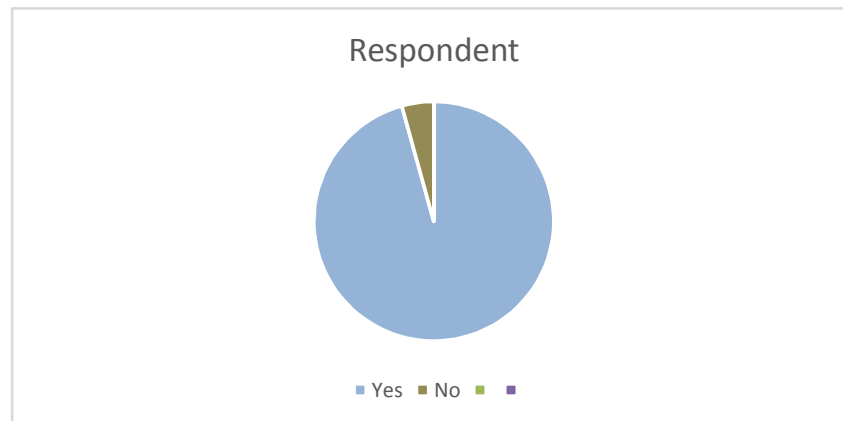


Table 1.3 Do you feel that green spaces contribute to your overall well-being.

Interpretation:

This Table shows what respondent feel about how green spaces contribute to their overall well-being, and we found 95.7% feel positively that green spaces contribute to overall well-being and 4.3% don't feel any impact of green spaces on their overall well-being.

4. Have you experienced any changes in your stress levels or mood after spending time in campus green areas?

Category	Respondents
Feeling well	57%
Relaxed	20%
Stressed	23%

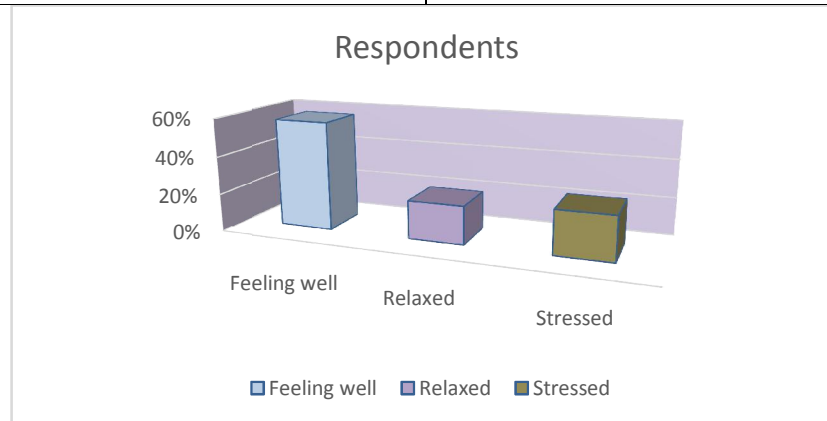


Table 1.5. Have you experienced any changes in your stress levels or mood after spending time in campus green areas.

Interpretation

In this table, people responded to the effect of spending time in campus green areas on their stress level and mood. we found that 57% of people feel well when they are in a green campus area while 20% of respondents feel relaxed when they are spending time in green areas and the remaining 23 % of respondents experience stress when they are in a green campus area.

Rate your level of concentration and focus while studying in campus green spaces (scale of, with 1 being low and 5 being high).

Scale	% Respondent
0	3.8%
2.5	7.7%
5	19.2%
7.5	30.8%
10	38.5%

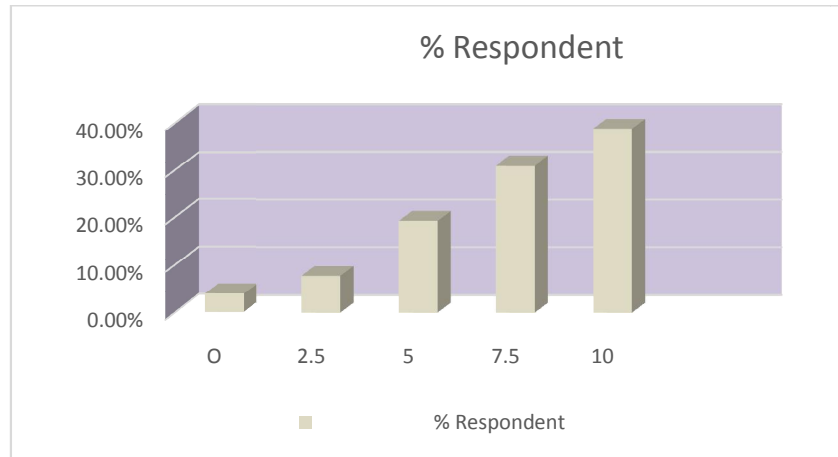


Table 1.5 Rate your level of concentration and focus while studying in campus green spaces (scale of, with 1 being low and 5 being high).

Interpretation

In above mention table, we found what level of concentration and focus respondents experienced while studying in green campus spaces. and the result revealed that 38.5 % of people experienced a high level of concentration and focus when they were studying in the green campus areas and 30.8% of people also feel concentrated and focused when they are studying in the green campus areas. 19.2% of people feel an average level of satisfaction when they are studying in the green campus area while 2.5% of people don't feel more concentration or focus when they are studying in the campus green areas.

III. RESULTS AND SUGGESTIONS

This study responded to three research objectives, namely, to measure the impact of campus green areas on academic achievement and student well-being using a multi-dimensional analysis, to clarify the significant effects of green spaces in educational environments, and it explore the complex interactions between environmental elements and human experiences, to aim to deepen our comprehension of the transformative potential that comes with incorporating nature into educational settings by revealing the complex dynamics at work, and to explore potential moderating variables that could influence the relationship between campus green spaces and student outcomes, such as socio-economic background, cultural differences, academic major, and level of campus involvement.

Based on the analysis of data we found that the Gender Profile of Respondents (Table 1.1):The survey consisted of 200 respondents, with 120 females and 80 males participating. Frequency of Visiting Campus Green Spaces (Table 1.2): The majority of respondents (73%) visit campus green spaces daily, indicating a high frequency of engagement.18% visit once a week, suggesting regular but less frequent engagement.9% never visit campus green areas, indicating a minority who do not engage with these spaces. Perception of Green Spaces on Overall Well-being (Table 1.3):A significant majority (95.7%) of respondents feel positive about the contribution of green spaces to their overall well-being.Only a small percentage (4.3%) do not perceive any impact of green spaces on their well-being. Effect of Green Spaces on Stress Levels and Mood (Table 1.4):A majority (57%) of respondents feel well in green campus areas, indicating a positive effect on their stress levels and mood.20% feel relaxed, while 23% experience stress, suggesting mixed responses to the environment. Level of Concentration and Focus in Campus Green Spaces (Table 1.5):A significant proportion (69.3%) of respondents experienced either high or moderate levels of concentration and focus while studying in green campus areas. Specifically, 38.5% reported a high level, 30.8% reported a moderate level, and 19.2% reported an average level of concentration and focus.Only a small percentage (2.5%) reported low levels of concentration and focus.

IV. SUGGESTIONS

Based on the responses provided, it's evident that there is a recognition of the significant benefits of having green spaces on campus, including mental well-being, physical health, improved air quality, enhanced learning environments, community engagement, environmental education, and aesthetic value. Additionally, respondents acknowledge the potential influence of cultural differences on how students utilize and perceive green areas on campus. Here are some summarized suggestions for a research paper based on the provided responses:

Mental Well-Being: Green spaces provide opportunities for students and teachers to unwind, lower stress and anxiety levels, and enhance their general mental health. **Physical Health:** Walking, jogging, and other outdoor workouts are examples of physical activity that is encouraged in green spaces and contributes to a healthy lifestyle.

Better Air Quality: Green spaces with trees and plants help filter the air, making the campus a healthier place for everyone to be.

Improved Learning Environment: Having access to green areas enhances cognitive function, creativity, and focus, which benefits academic achievement.

Community Engagement: By acting as hubs for social interactions, green spaces help students, teachers, and staff feel more connected to one another.

Environmental Education: Learning about sustainability, biodiversity, and ecosystem dynamics can be done practically in green settings.

Aesthetic Value: Green areas improve the campus's aesthetic appeal and make the university community as a whole feel more welcoming and pleasant.

Cultural Influence: Students' attitudes towards nature, social norms, perceptions of safety, environmental knowledge, and cultural events and customs are all greatly impacted by cultural differences, which also have an impact on how they use and view campus green spaces.

Academic Achievement: Increasing physical activity is linked to improved academic achievement as well as improved brain function, focus, and general health. Green places promote physical activity.

Student Well-Being: Having access to green spaces lowers stress levels, fosters a more positive atmosphere, and enhances students' general sense of contentment and well-being.

These summarised recommendations focus illumination on the many advantages of campus green spaces, such as their effects on academic performance, mental and physical health, community involvement, and cultural awareness.

V. CONCLUSION

The findings of this study underscore the profound significance of green spaces in educational environments, providing a multitude of advantages that go well beyond aesthetics. After a thorough examination of the data, it is clear that campus green spaces are crucial in determining students' academic performance, general experiences, and well-being.

Studies have indicated that green areas have a critical role in improving mental health by offering opportunities for stress relief, relaxation, and mood enhancement. Additionally, these spaces encourage physical activity, which in turn encourages a healthy way of life for members of the campus community. Moreover, having greenery improves the learning atmosphere by encouraging kids to pay closer attention, be more creative, and use their brains more

Significantly, green areas work as stimulants for community involvement, encouraging interpersonal relationships and a feeling of community among university community members. Additionally, they provide priceless venues for environmental education that advance ecological literacy and knowledge of sustainability. Cultural effects become evident as important determinants of how people use and perceive green spaces, highlighting the significance of taking into account a range of cultural viewpoints in campus planning and design.

In the end, the study emphasizes how incorporating nature into learning environments may have a profound impact, underscoring the necessity for planners, administrators, and legislators to give priority to the establishment and maintenance of green spaces on campuses. By doing this, organizations can improve the emotional and physical health of their members while also fostering a lively, diverse, and sustained campus community that is favourable to academic success and personal growth.

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