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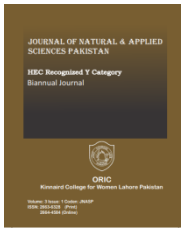

IMPACT OF GREEN SPACES ON THE MENTAL HEALTH AND ACADEMIC ACHIEVEMENTS OF THE COLLEGE STUDENTS OF LAHORE-PAKISTAN

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Abstract

Using a mixed-methods approach, this study analyses the effect of green spaces on college students' mental well-being and academic accomplishment. Recognizing the importance of mental health and academic achievement in college settings, this study seeks to investigate the possible advantages of parks and gardens as natural ecosystems in enhancing student welfare as well as educational results. The study looks at the link between engagement to green spaces and several markers of mental health, such as symptoms of depression, anxiety, and stress, as well as academic achievements like high school graduation rates. The study uses both quantitative indicators, such as surveys and impartial evaluations of open space availability, and qualitative methodologies. The findings of this study add to the developing body of research on the role vegetation plays in promoting student health and academic achievement, with possible implications for college campuses design, student assistance programs, and educational initiatives aimed at creating more positive and pleasant learning environments for students in higher education.

Keywords
Mixed-Methods Approach, Anxiety, Qualitative Methodologies, Academic Achievement, Learning Environments

1.Introduction

Nature plays a crucial role in mental health, providing energy, relaxation, and mental stimulation. However, the reduction of green spaces in educational institutions is causing significant negative impacts on students' mental health, academic achievement, and stress levels (Yang *et al.*, 2022). In Pakistan, 42.66% of undergraduate and post-graduate students are experiencing depression due to less successful future plans. Rehmani *et al.*, (2018) have analyzed that mental health is a significant concern for both genders, and studies show that green areas can reduce stress and promote good health. Preferred campus locations are based

on design, high quality, location, and accessibility, rather than size. Institutions with less visible green spaces can improve their reputation and educational experience by planning and administering their meagre green spaces. However, large campuses may offer room for greener areas important for sustainability and biodiversity (Speake *et al.,* 2013). Takano *et al.,* 2002 have stated that urban planning should prioritize nearby, walkable green public spaces in densely populated areas in megacities. Cooperation between health, construction, civil engineering, planning, and other concerned sectors should be performed to promote the health of elderly residents. Increasing the amount of green space in urban areas can result in significant total improvements in certain areas, and even small individual advantages can have major consequences (White *et al.,* 2013). The psycho-social value of greenery can provide psycho-social outcomes such as social cohesion and reduced isolation, which have not been systematically captured or statistically validated (Malekinezhad *et al.,* 2020). The major problem of this study is areas of Green Spaces reducing day by day in colleges of Lahore. Therefore, this study is conducted to investigate that lack of greenery in colleges of Lahore can affect the academic achievement of students as well as to investigate that college students can get stressed due to lack of greenery in colleges of Lahore.

1.1 Study Area

Lahore, Punjab, Pakistan will be study area, which is located at 31°32′59″N 74°20′37″E. Colleges of different sector in Lahore has been selected for the research, after observing the more and less green space of colleges through online pictorial survey of colleges. Five colleges have been get randomly selected according to their infrastructure and also considering the fact that it's covering the most parts of Lahore. They are both private and government colleges. In north, Crescent college for boys, Kinnaird college for women university and in south Punjab college Johar town Lahore, Concordia college Wapda Town Lahore and Concordia college Johar town Lahore.

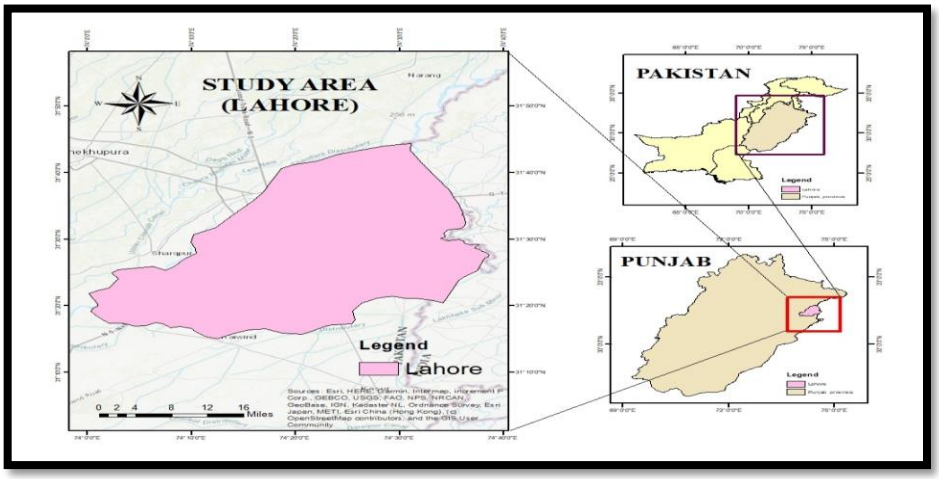


Figure 1: Map of Study Area (Source: ArcMap 10.7)

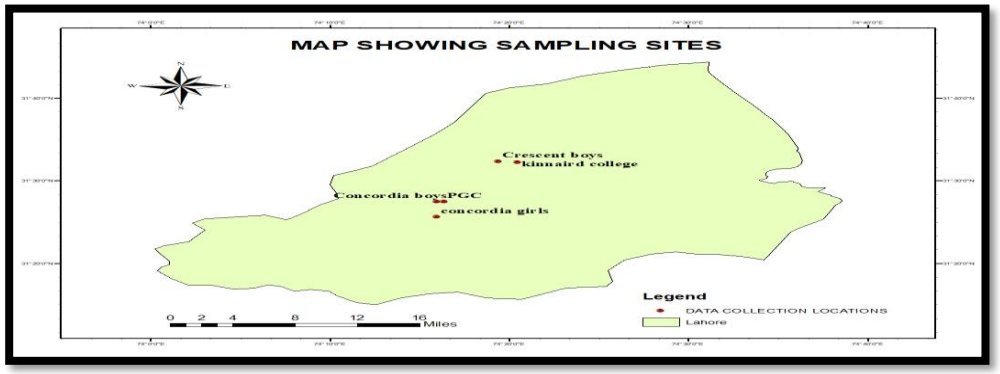


Figure 2: Map Showing Sampling Sites

1.*2 Material and Methodology*

The research used a random data collection method, including closed-ended and open-ended questionnaires, to measure the perceived stress and academy achievement of college students in Lahore. A total of 300 questionnaires were distributed among students, with 150 females and 150 males selected from all colleges. The questionnaires contained personal information, perceived stress level, green space area, and academy achievement. The study used primary data and secondary data from online research articles to analyze the influence of green spaces on mental health and academy achievement. The qualitative nature of the study used pie charts, bar graphs, frequency and percentages methods, and Chi-Square test to prove the hypothesis. The study area map was created using ARC MAP 10.7 and 10.5. The sample size included 150 females and 150 male students from Lahore's colleges, with 75 males from Crescent College, 75 females from Kinnaird College, 25 males and 25 females from Punjab College Johar Town, and 50 males from Concordia College.

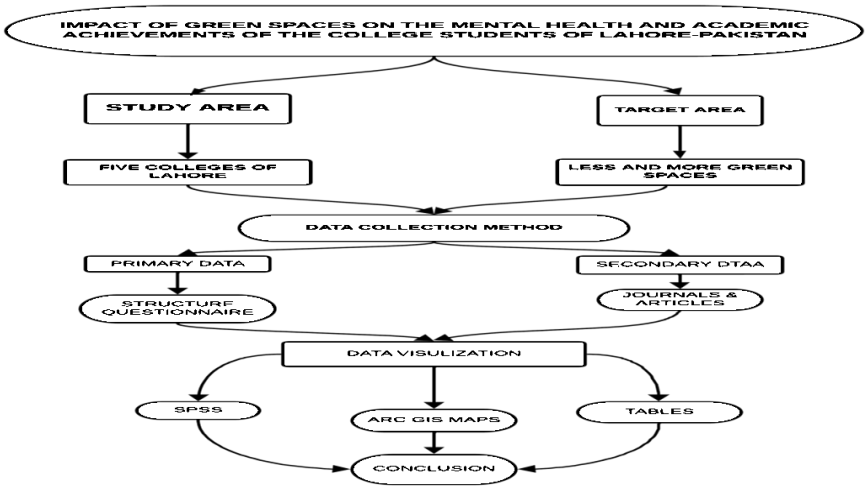


Figure 3: Flowchart of Methodology

1.3 Results and Discussion

The study explores students' perceptions of green spaces on higher education campuses in Lahore. Results show that students in green spaces have a higher level of awareness and respect for green spaces, which improves the atmosphere and ecological diversity of higher education institutions. Green spaces also have a significant link with learning achievement, with a larger proportion of students achieving high grades in green spaces. This suggests that green spaces can improve academic achievement by reducing stress levels and increasing thinking ability. Yang *et al.*, (2022) analysis that depression is a global concern, and green spaces support various activities, such as sports and social connections, which improve students' well-being and community. However, urban growth and expansion may pose threats to green spaces, affecting biodiversity protection and environmental sustainability. Despite the positive relationship between green spaces and academic achievement, gender inequalities exist in stress levels, emphasizing the need for specialized treatments for gender-specific mental health challenges. The findings underscore the importance of protecting and encouraging green areas in educational institutions to improve students' academic achievement, mental health, and overall quality of life.

1. The greening area of our campus is large and comfortable.

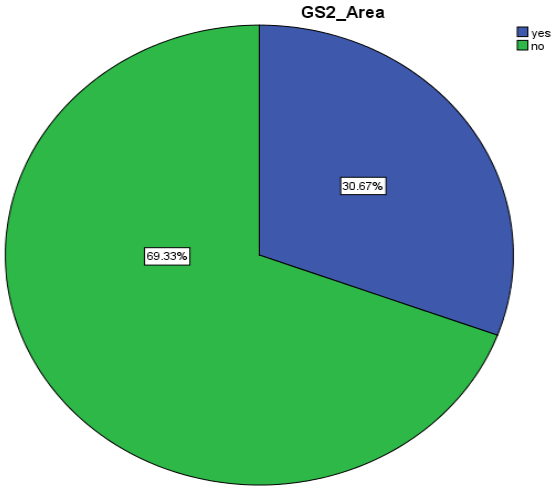


Figure 4: (a) showing the non-greenspace area college

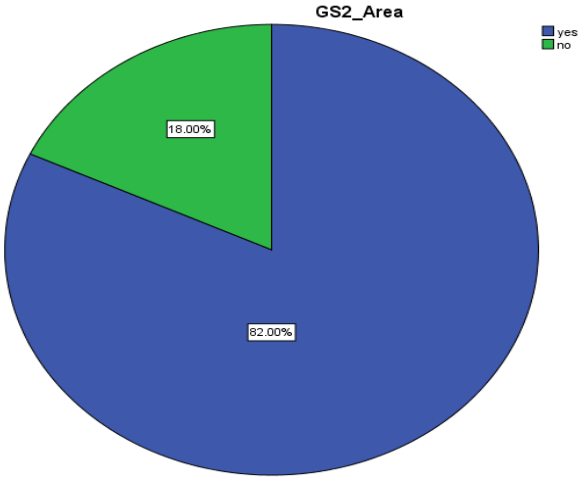
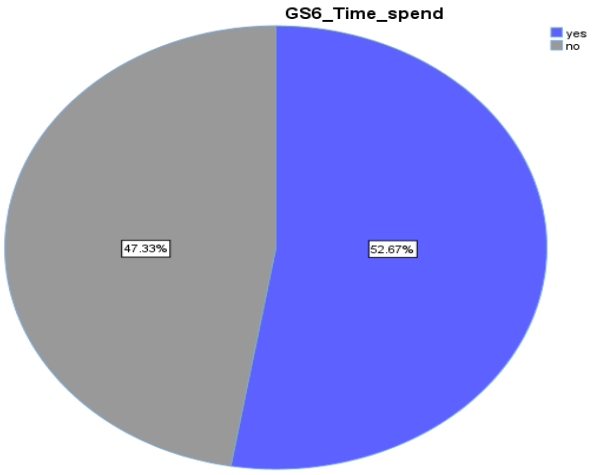


Figure 4: (b) showing the Greenspace area college

By figure 4 (a) and (b), students of green spaces feel 82.00 % more comfortable in their college area but in contrast non greenspace students feel 30.67% comfortable in their college area.

1. Green spaces, where you can spend your time interacting with other people



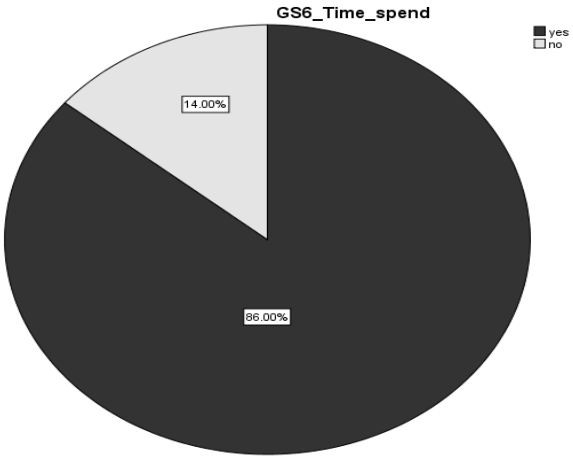


Figure 5: (a) showing the percentage of area to interact with other students in non-greenspace colleges.

Figure 5: (b) showing the percentage of area to interact with other students in greenspace colleges.

By figure 5 (a) and (b), there is 86.00% space for students to interact with each other in greenspace area colleges but in non-greenspace area colleges there is only 52.67% spaces for interaction which is less than greenspaces colleges

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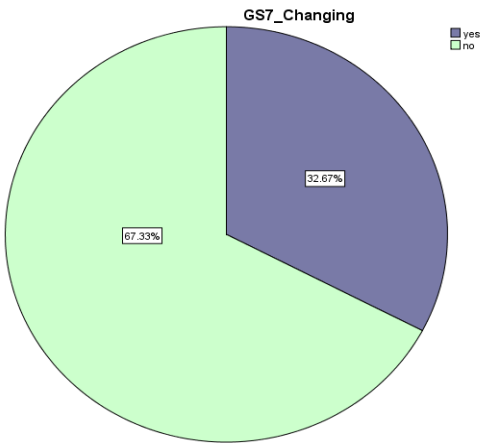
2. Have you observed any changes in last 10 ten years in your campus, like construction of new building on green spaces?



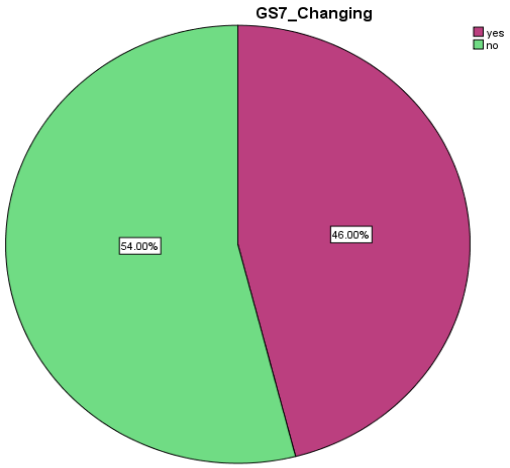
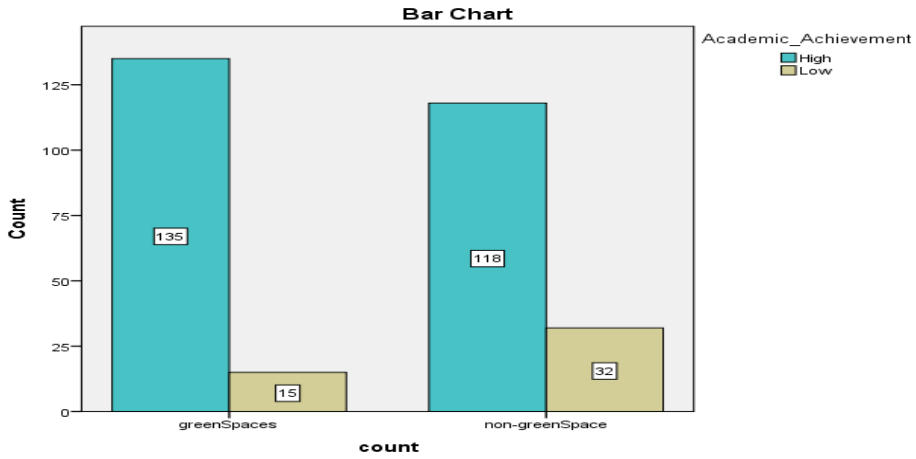


Figure 6: (a) showing the percentage of changing in non-greenspaces area colleges

Figure 6: (b) showing the percentage of changing in greenspaces area colleges

By figure 6 (a) and (b), there are 46.00% changes in greenspaces area colleges and 32.67% changes in non-greenspaces areas colleges. That means there are more construction activities in greenspace area then non-greenspace area. That is also highlighting the research objective that in Lahore greenspaces are getting less day by day due to construction activities.

1. How is your academic achievement?



Test applied: Chi-square T-Test

Figure 7: showing the comparison of academic achievement of non-greenspace and greenspace students in Lahore

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.259[a]	1	.001		
N of Valid Cases	300				

By Using the chi-square test, academic achievements of greenspace and non-greenspaces have been analysed which shows that p-value is 0.001 which is less than 0.05 so we will accept the alternative hypothesis which says there is effect of greenspaces on the academic achievements of students. And as the bar chart figure 7 shows that 135 students have high performance in greenspace area and only 118 students have high performance in non-greenspace area.

H_1 Green spaces have effects on the academic achievements of college students.

H_0 Green spaces have no effects on the academic achievements of college students.

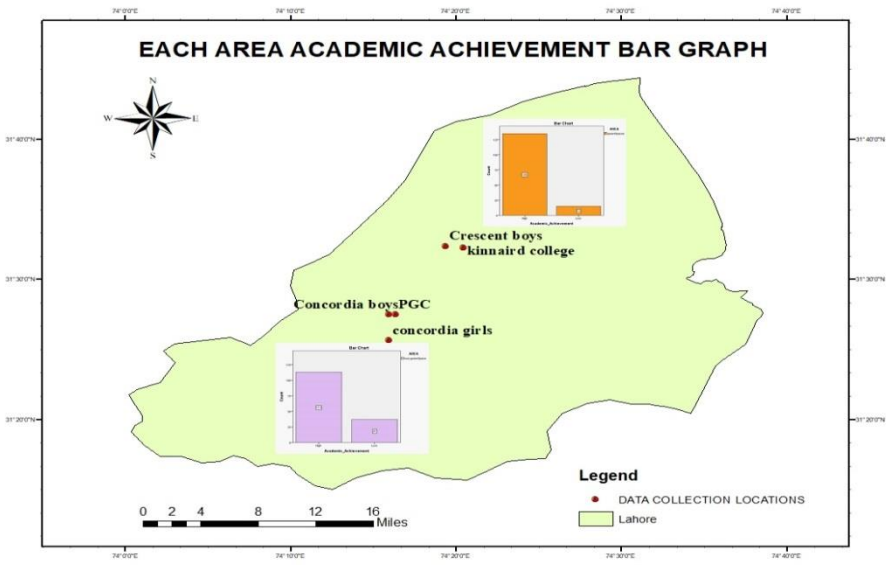


Figure 8: map showing each area academic achievement bar graph
Source: ArcMap 10.7

1. Stress level of students in colleges.

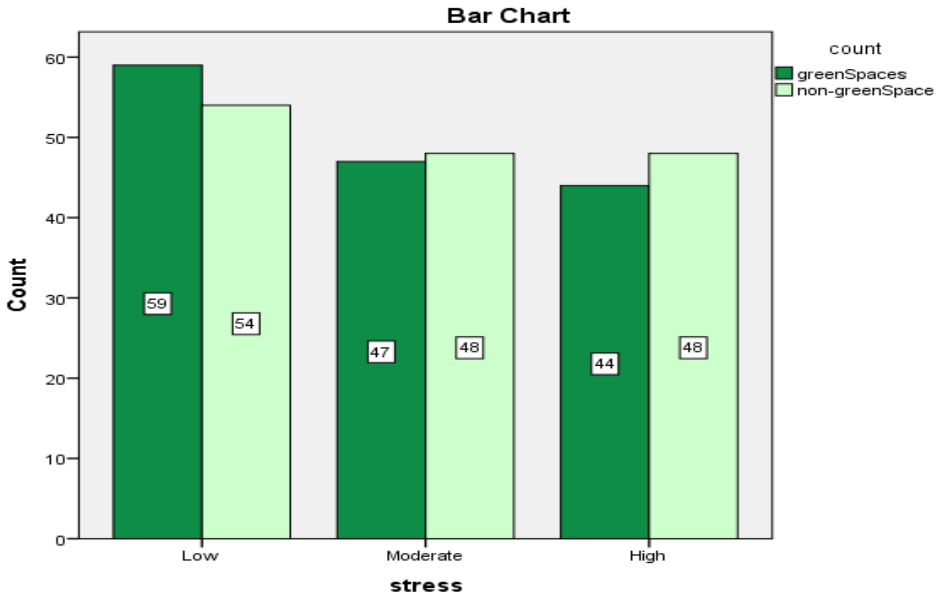


Figure 9: showing the comparison of mental health of non-greenspace and greenspace students in Lahore

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.988[a]	2	.018
Likelihood Ratio	8.037	2	.018
Linear-by-Linear Association	7.848	1	.005
N of Valid Cases	300		

By Using the chi-square test, mental health of greenspace and non-greenspaces have been analysed which shows that p-value is 0.018 which is less than 0.05 so we will accept the alternative hypothesis which says there is effect of greenspaces on the mental health of students. And as the bar chart figure 9 shows that 44 students have high stress level in greenspace area and 48 students have high stress level in non-greenspace area. And 59 students have low stress level in greenspace area colleges and 54 students have low stress level in non-greenspace area colleges.

H_1 Green spaces have effects on the mental health of college students.

H_0 Green spaces have no effects on the mental health of college students.

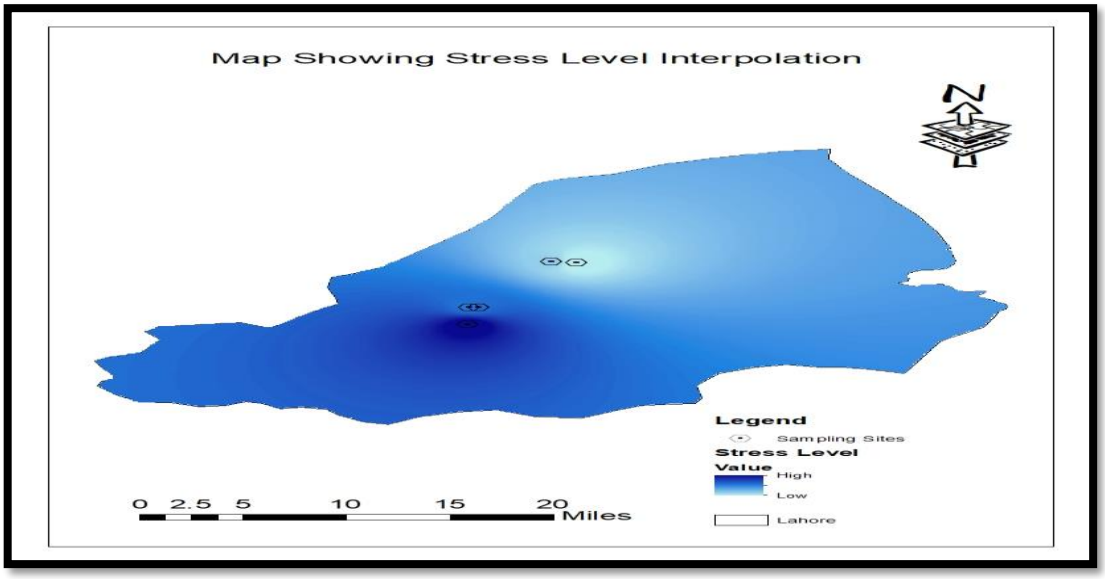


Figure 10: each area stress level bar graph (Source: ARCMAP 10.7)

Interpolation of stress level in Greenspaces and Non-Greenspaces Through ARC MAP 10.5

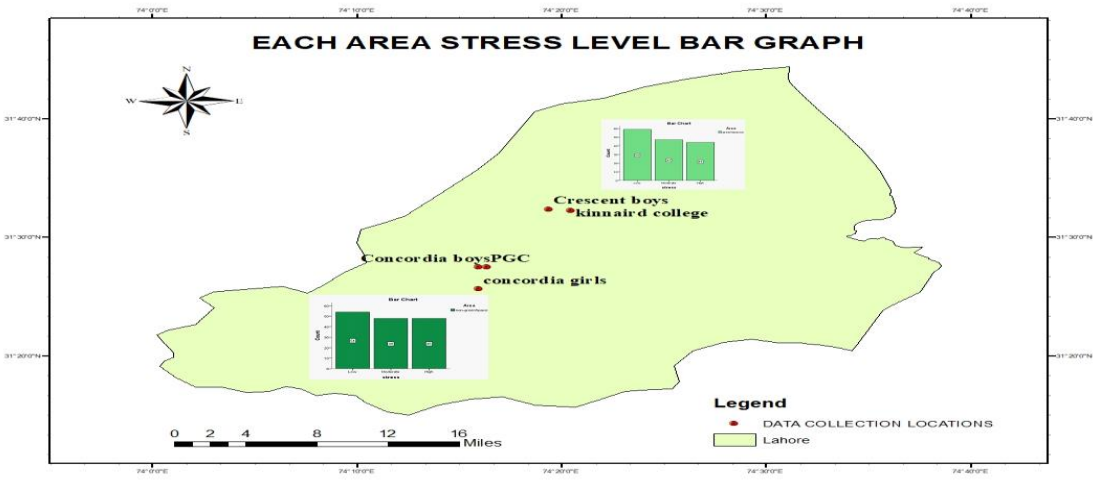


Figure 11: map showing stress level interpolation (sources: arc map 10.5)

Through figure 11, we analysed that even arc map 10.5 version interpolated the same stress level of greenspaces and non- greenspaces as we did through SPSS. In north of Lahore, we got less stress level and in south we got higher stress level in both female and male colleges students.

Interpolation of Academic Achievement in Greenspaces and Non-Greenspaces Through ARC GIS 10.5

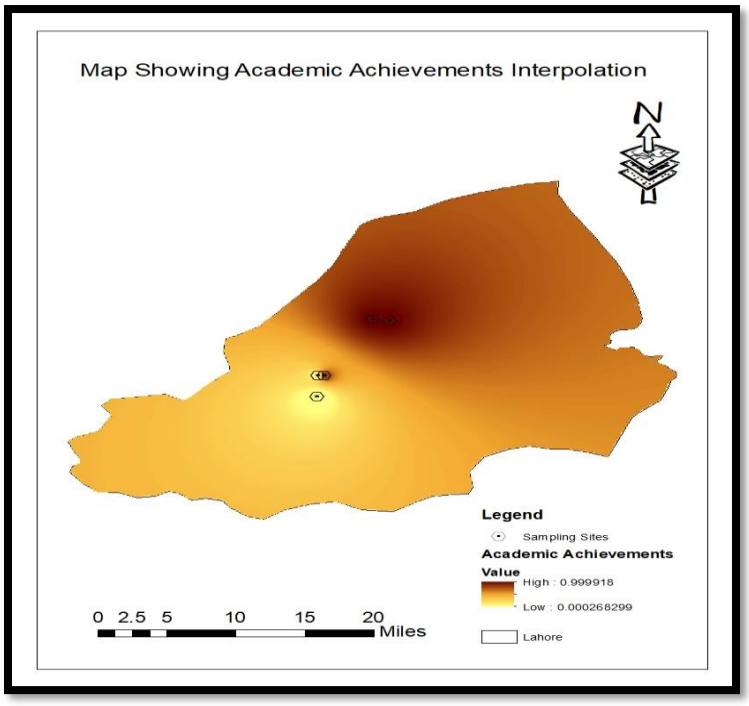


Figure 12: map showing academic achievement interpolation (Sources: ARC MAP 10)

Through figure 12, we analysed that even arc map 10.5 version interpolated the same stress level of greenspaces and non- greenspaces as we did through SPSS. In north of Lahore, we got higher Academic Achievements and in south we got less Academic Achievements in both female and male colleges students.

2. Showing Data Through Computer-Language Python

The python-based script for searching the data of greenspace area and non-greenspace area stress level and grades of students in each institute.

```
# import pandas lib as pd
import pandas as pd
# read by default 1st sheet of an excel file
greenspaces = pd.read_excel('Greenspaces data.xlsx')
non_greenspaces = pd. read excel ('non-greenspaces area.xlsx')
def print menu ():
print ("Please select any options below:")
print("1. Green spaces")
print ("2. Non Green spaces")
```

```
print("3. Exit")
while True:
print menu ()
choice = int (input ("Enter option:"))
if choice == 1:
print ("\nGreen Spaces")
print (greenspaces. group by (by= ['Stress Level', "Grade","Gender"]) ["Stress Level"].value counts().to string ())
print("\n")
if choice == 2:
print ("\nNon Green Spaces")
print (non_greenspaces. group by (by= ['Stress Level', "Grade","Gender"]) ["Stress Level"].value counts().to_string ())
print("\n")
if choice == 3:
print ("exiting...")
break
```

3. Result

This code helps us to access data of 300 students of colleges of greenspace area and non-greenspaces area in Lahore. With reference to female and male stress level and academic achievement.

4. Conclusion

Conclusively, this study illuminates the noteworthy influence of green areas on Lahore college campuses, demonstrating their significance that extends beyond their visual appeal. According to the research, green areas improve the well-being of and sense of community by creating a cozier, more aesthetically pleasant atmosphere and by offering chances for a range of activities and social contacts. However, the growing number of construction projects on open space areas endangers their sustainability and preservation, thus stakeholders and policymakers need to pay attention. The research is noteworthy because it shows a favorable correlation between academic achievement and green spaces. This suggests that protecting and promoting green spaces should be a top priority in order to boost students' educational achievements. Furthermore, gender disparities in stress levels highlight how critical it is to address mental health issues through focused treatments and support services, especially for female students. Overall, the study highlights the many advantages of green spaces at college campuses and urges coordinated action to safeguard, preserve, and utilize these priceless assets for the success and well-being of learners in Lahore and elsewhere.

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