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Impact of Landscape Components on User Wellbeing in the University Environment, Minna, Nigeria

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Abstract

It is believed that one's ability to appreciate aesthetics, general health, and well-being are all impacted by the visible landscape. Lecture halls are a vital component of learning environments because they give lecturers and students a place to teach, learn, and do academic work. The purpose of this study is to examine the effects of landscape elements on user well-being in lecture rooms at the Federal University of Technology, Minna (FUTMINNA), Nigeria. Specifically, the study looks at the effects of natural light, vegetation, and outdoor views on user wellbeing. The study used a survey questionnaire approach to gather information from 200 staff members and students as a sample. The study found a number of crucial landscape elements that significantly affect students' well-being in lecture halls. According to the research, adding these landscape elements can greatly improve learning by boosting satisfaction overall, lowering stress levels, and enhancing concentration. Additionally, the study discovered that outdoor vistas and natural lighting were important in enhancing happy emotions and lowering negative ones. It also identified the particular types of flora that were most beneficial in enhancing wellbeing, such as trees and flowering plants. The study's findings can be applied to the design of lecture halls and other learning environments in the future, emphasizing the value of using landscape elements to improve user wellbeing and the learning process.

Keywords: Landscape, environment, natural elements, educational environments

INTRODUCTION

Lecture halls are an essential part of learning environments because they give lecturers and students a place to teach, learn, and do academic work. However, studies have indicated that traditional lecture halls can be a major cause of anxiety and discomfort for attendees, with elements like dim lighting, insufficient ventilation, and a dearth of windows overlooking the outside having a detrimental effect on attendees' well-being (Soleimanipirmorad and Vural, 2018) [1]. According to recent research, adding natural elements to classrooms—like plants, daylight, and views of the outdoors—can improve students' academic performance and overall well-being (Dadvand and Nieuwenhuijsen, 2019) [2]. Despite the growing recognition of the importance of classroom design in promoting student wellbeing and learning outcomes, there is still a lack of understanding regarding the specific components of the physical environment that contribute to these positive effects. Furthermore, most of the existing research on classroom design has been conducted in developed countries, with limited attention paid to the unique cultural and environmental contexts of developing countries like Nigeria (Tadesse &

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Muluye, 2020) [3]. In Nigeria, a country with a rapidly growing population and a significant need for high-quality education, the design of lecture rooms and other educational spaces is of critical importance. The School of Agriculture and Agricultural Technology at the Federal University of Technology, Minna (FUTMINNA), Nigeria, is one such institution that is in need of better-designed lecture rooms that promote user wellbeing and academic success. In response to this need, the current study aims to explore the influence of landscape components on user wellbeing in lecture rooms at FUTMINNA.

Studies have indicated that exposure to natural light offers numerous health and wellness benefits for humans, including enhanced mood and cognitive performance (Shishegar and Boubekri, 2016) [4]. Furthermore, studies have connected higher wellbeing and lower stress levels to the presence of plants (Rugel et al., 2017) [5]. Additionally, it has been discovered that having views of the outdoors improves cognitive function and academic achievement (Asigbee et al., 2018) [6]. Lecture halls are an important educational setting where students spend a lot of time in the FUTMINNA School of Agriculture and Agricultural Technology. Therefore, the way these lecture halls are designed is crucial to improving learning and supporting the well-being of students. Sadiku-Dushi (2019) [7]. The physical environment of a classroom, which includes lighting, temperature, seating arrangements, and decoration, influences students' cognitive, emotional, and behavioral responses. This has a major effect on student learning outcomes. (Gilavand, 2016; Wang & Degol, 2016) [8]. One important feature that has been found to have a positive effect on both academic performance and student wellbeing is the usage of natural elements, such as greenery and natural light (Hodson & Sander, 2017) [9]. Nevertheless, despite these results, further study is still required to investigate the precise mechanisms underlying these impacts and to identify the best design approaches for integrating these elements into various educational situations. This knowledge gap is what motivated the current study, which aims to fill it by surveying users extensively in order to pinpoint the precise landscape elements that have the biggest effects on wellbeing and how to incorporate them into lecture room designs to make them more efficient and user-friendly.

Thus, a key element in fostering student performance and well-being is the design of lecture halls and other learning environments.

LITERATURE REVIEW

Since research has demonstrated that the physical environment of classrooms can have a major impact on student learning outcomes, the design of educational spaces has gained importance (Gilavand, 2016) [8]. The physical aspects of a classroom comprise several elements such as temperature, lighting, seating configurations, and décor, all of which have an impact on students' behavioral, emotional, and cognitive reactions (Wang & Degol, 2016) [10]. One important feature that has been found to have a significant impact on both student wellbeing and academic performance is the usage of natural components, such as plants and natural light (Hodson & Sander, 2017) [9].

The physical classroom environment can have an impact on students' motivation, emotions, and behavior, among other aspects of their wellness (Wang & Degol, 2016) [10]. According to a study of literature, classroom design can affect how well kids pay attention and remember things (Gilavand, 2016) [8]. For instance, research has shown that pupils' attention spans and levels of alertness are enhanced by natural light, whereas artificial lighting may negatively affect cognitive function (Brink et al., 2021) [11]. Caruth, G. D. (2018) [12].

Furthermore, studies indicate that adding natural components to classrooms—like plants and outside views—can enhance students' mental health and lower their stress levels (Peters & D'Penna, 2020) [13]. According to Trevino et al.'s comprehensive review from 2022, being around greenery can improve mental health by easing the symptoms of despair and anxiety. In a similar vein, Peters & D'Penna's (2020) [13] study discovered that adding natural components to a classroom—like plants and daylight—improved learning results and decreased stress among students. Realyvásquez-Vargas (2020) [14].

Impact of Classroom Environment on Academic Performance

According to research, a classroom's architectural layout can affect students' motivation, engagement, and academic success (Allen et al., 2017). The degree of student engagement, which is essential for academic performance, can be influenced by a classroom's design (Caruth, 2018). According to studies, adding natural features to classrooms can boost students' motivation, engagement, and contentment with the place they are learning in (Peters & D'Penna, 2020) [13].

Additionally, academic achievement and the caliber of learning experiences can be impacted by a classroom's design. For instance, Gilavand's (2016) [2] systematic review discovered that nursing students' academic and clinical performance might be influenced by their learning environment, which includes factors like temperature, noise level, and illumination. Similar findings were made by Allen et al. (2017) [15], who found that classroom layout and conditions, such as air flow and seating, can affect the academic performance of pupils.

Role of Landscape Components in Classroom Design

It has been determined that including landscape elements in classroom design—such as plants and natural light—is an effective approach for raising student well-being and academic achievement (Hodson & Sander, 2017) [9]. In the opinion of Peters and D'Penna (2020) [13], incorporating natural elements into a learning environment can improve its visual appeal and comfort while fostering good emotional reactions and lowering stress levels. Furthermore, views of the outdoors can foster a sense of openness and connection to nature, which can enhance students' feelings of relaxation and reduce stress (Peters & D'Penna, 2020) [13]. Natural light can also help students be more alert and attentive. Additionally, research has demonstrated that being around greenery enhances happiness and cognitive function (Yin et al., 2018) [16]. Trees and blooming plants in particular have been proven to be the most beneficial for enhancing health, possibly due to their aesthetic qualities (Wang et al., 2019) [17]. Zhang et al. (2020) [18] discovered that exposure to greenery and the outdoors improves mental health by lowering stress and elevating happy feelings. Yin, J., Zhu, S 2018 [19]. Additionally, they discovered that exposure to natural light has a significant role in enhancing wellness by regulating the circadian cycle of the body and elevating mood. Research also supports the significance of outdoor views in fostering wellness. For instance, a study by Soga et al. (2021) [20] discovered that having a window with a view of the outdoors can improve mental health and wellness by lowering stress and elevating happy feelings. Furthermore, Ko et al. (2020) [21] discovered that interior environments with views of nature, such as lecture halls, can improve academic achievement since they foster calm and improve cognitive abilities.

Regarding particular vegetation types, Kweon, B. S. (2017) [22] found that trees and blooming plants have been found to be very beneficial in enhancing well-being. According to a study by Gunn et al. (2022), [23] having flowering plants in a classroom can greatly lessen stress levels and increase output. Similar findings were made by Yu & Hsieh (2020) [24], who discovered that being in a setting with lots of trees and blooming plants—a forest—can significantly improve mood and cognitive function. Additionally, studies have demonstrated that adding natural aspects to classroom settings can increase students' enthusiasm and engagement levels (Kariippanon et al., 2018) [25]. This is in line with the theory of biophilia, which contends that people are inherently drawn to nature and that spending time in natural settings improves happiness and productivity (Yin et al., 2020) [16].

In conclusion, research suggests that adding landscape elements to learning environments, such as greenery, natural light, and outdoor views, can significantly improve user wellbeing and academic results. To find the best design approaches for integrating these elements into various educational environments and to investigate the precise mechanisms underlying these impacts, more research is necessary. The current study supports the literature's repeated recommendation that more research be done to better understand the methods and approaches for integrating landscape elements into various educational contexts, specifically in the context of lecture halls at the School of Agriculture and Agricultural Technology, FUTMINNA, Nigeria.

RESEARCH METHODOLOGY

The study is a quantitative research design that involves collecting and analyzing numerical data to identify patterns and relationships between variables. The study was designed to investigate the impact of natural light, vegetation, and outdoor views on user wellbeing in lecture rooms. The survey questionnaire was designed using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to allow participants to express their level of agreement with the statements (Taherdoost, 2019) [26] and Trevino, J. E. (2022) [27]. The study aimed at collecting data from a sample of 200 students and staff members at the School of Agriculture and Agricultural Technology, FUTMINNA, Nigeria. This sample size is in line with similar studies examining the impact of environmental factors on user wellbeing in educational spaces (Morton et al., 2016) [28], Naigaga, P. (2019) [29].

The participants were selected using a sampling technique to ensure that they were representative of the target population. The sample size was 200 participants. The study employed a survey questionnaire approach to collect data on the impact of natural light, vegetation, and outdoor views on user wellbeing. The survey questionnaire was adapted from previous studies that examined the influence of environmental factors on user wellbeing in educational spaces (Realyvásquez-Vargas et al., 2020) [20]. The participants were informed about the study's objectives and sought their approval to participate in it. The participants were assured of their confidentiality, and their responses were kept anonymous.

The data collected from the survey questionnaire was analyzed using descriptive statistics, including mean, standard deviation, and frequency distribution. The study aimed to identify the key landscape components that have a significant impact on the wellbeing of users in lecture rooms. To achieve this, a multivariate analysis of variance (MANOVA) was conducted to examine the differences in the perceptions of the participants regarding the impact of natural light, vegetation, and outdoor views on user wellbeing (Berger et al., 2022) [30]. This analysis was performed using IBM SPSS Statistics software, version 22.0.

DATA PRESENTATION AND ANALYSIS

Quantitative Data Presentation

Quantitative data presentation is the organization of the analyzed collected data and the interpretation of findings/result obtained. The quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) version 22. Tables and charts were employed in the presentation of the results.

Respondents' Response Percentage

Table 1 shows the figure of an online questionnaire administered through the use of a Google Form. A total of 200 responses were received. This represented a 100% response rate and was considered adequate for the analysis carried out according to Sadiku-Dushi *et al.*, 2019.

Table 1. Respondents' response rate.

Responses (No) X	Valid (No) Y	Invalid (No) Z	% of valid responses (Y/X*100)
200	200	0	100%

RELIABILITY TEST I

The reliability statistics in Table 2 represent the user's wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria. In Table 2 we have the Cronbach's alpha (0.405) and the number of items (8). The reliability (internal consistency) is 0.405, which is below the recommended threshold of 0.70. Thus, we have an internal consistency problem.

Table 3 shows the item statistics (mean, standard deviation, and sample size, N) for each of the items. Considering all eight questions, on average, the respondents "agreed' to each of these questions, hence choosing 4 on the Likert scale. Also, the standard deviation for most of the questions is approximately 1, which means the questions are closely related.

Table 2. Reliability Statistics.

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
.405	.564	8

Table 3. Item statistics.

	Mean	Std. deviation	No.
I feel relaxed during lectures.	2.9000	1.61960	200
I feel comfortable during lectures.	1.4950	1.00250	200
I am able to concentrate better when the natural lighting is good.	3.0200	1.46983	200
I am able to concentrate better when there is greenery in the lecture room.	2.9700	1.37789	200
I am able to concentrate better when there are outdoor views from the lecture room.	4.6100	1.01144	200
I feel more productive during lectures when the environment is conducive.	4.9200	.27197	200
I feel less stressed during lectures when the environment is conducive.	4.8900	.31367	200
I am satisfied with the overall learning experience in my lecture room.	4.3700	.68955	200

Table 4. Correlation summary item statistics.

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-item correlations	.139	-.085	.839	.923	-9.907	.028	8

The correlation summary item statistics in Table 4 show that the correlation between user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, and the respondents having a 0.139 mean value has a positive relationship between them.

Table 5. Item-total statistics.

	Scale means if an item deleted.	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
I feel relaxed during lectures.	26.2750	10.301	.151	.116	.404
I feel comfortable during lectures.	27.6800	11.555	.284	.110	.323
I am able to concentrate better when the natural lighting is good.	26.1550	10.282	.218	.136	.350
I am able to concentrate better when there is greenery in the lecture room.	26.2050	12.114	.051	.132	.448
I am able to concentrate better when there are outdoor views from the lecture room.	24.5650	12.307	.164	.049	.377
I feel more productive during lectures when the environment is conducive.	24.2550	13.819	.299	.727	.383
I feel less stressed during lectures when the environment is conducive.	24.2850	13.773	.269	.719	.382
I am satisfied with the overall learning experience in my lecture room.	24.8050	12.188	.381	.197	.316

From Table 1, the reliability statistic is 0.405. Looking at Table 5, Cronbach's alpha for the item deleted column (I am able to concentrate better when there is greenery in the lecture room) has a

Cronbach's alpha of 0.448 if deleted from the question) from the analysis, the reliability (internal consistency) of 0.405 is above the recommended threshold of 0.70. Thus, we have an internal consistency problem. While the correlation is positive, i.e., there is a relationship.

In Table 6, the p-value is 0.00 for the user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, which is less than 0.05. This signifies that the relationship between user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, and respondent opinion is statistically significant.

Table 6. ANOVA.

		Sum of squares	df	Mean square	F	Sig
Between people		360.609	199	1.812		
Within people	Between items	2131.249	7	304.464	282.440	.000
	Residual	1501.626	1393	1.078		
	Total	3632.875	1400	2.595		
Total		3993.484	1599	2.497		

Grand mean = 3.6469

RELIABILITY TEST II

The reliability statistics in Table 7 represent the influence of landscape components on your wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria. In this table, we have the Cronbach's alpha (0.905) and the number of items (3). The reliability (internal consistency) is 0.905, which is above the recommended threshold of 0.70. Thus, we don't have an internal consistency problem.

Table 7. Reliability Statistics.

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
.905	.965	3

Table 8. Item statistics.

	Mean	Std. deviation	No.
How would you rate the impact of vegetation on your wellbeing during lectures?	4.4800	.50085	200
How would you rate the impact of outdoor views on your wellbeing during lectures?	4.4550	.54724	200
How would you rate your overall learning experience in your lecture room?	4.0800	.99930	200

Table 8 shows the item statistics (mean, standard deviation, and sample size, N) for each of the items. Considering all the three questions, on average, the respondents "good' to each of these questions and hence choose 4 on the Likert scale. Also, the standard deviation for most of the questions is approximately 1, which means the questions are closely related.

Table 9. Correlation summary item statistics.

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-item correlations	.902	.861	.959	.098	1.114	.002	3

The correlation summary item statistics in Table 9 show that the correlation between the influence of landscape components on your wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, and the respondents having a 0.902 mean value has a positive relationship between them.

From Table 6, the reliability statistic is 0.905. Looking at Table 4 Cronbach's alpha if item deleted column (how would you rate your overall learning experience in your lecture room? has a Cronbach's alpha of 0.977 if deleted from the question) Table 10 show the reliability (internal consistency) of 0.905,

which is above the recommended threshold of 0.70. Thus, we don't have an internal consistency problem. While the correlation is positive, i.e., there is a relationship.

Table 10. Item-total statistics.

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if the item is deleted
How would you rate the impact of vegetation on your wellbeing during lectures?	8.5350	2.240	.943	.934	.841
How would you rate the impact of outdoor views on your wellbeing during lectures?	8.5600	2.137	.917	.921	.831
How would you rate your overall learning experience in your lecture room?	8.9350	1.076	.882	.788	.977

Table 11. ANOVA.

		Sum of squares	df	Mean square	F	Sig
Between people		258.985	199	1.301		
Within people	Between items	20.083	2	10.042	81.149	.000
	Residual	49.250	398	.124		
	Total	69.333	400	.173		
Total		328.318	599	.548		

Grand mean = 4.3383

In Table 11, the p-value is 0.00 for the influence of landscape components on the wellbeing of lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, which is less than 0.05. This signifies that the relationship between the influence of landscape components on wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, and respondent opinion is statistically significant.

Demographic Data

Table 12 shows the gender of respondents in the study. As revealed, there are 111 male respondents (55.5%) and 89 female respondents (44.5%). This implies that male respondents are more likely to female respondents.

Table 12. Gender.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Male	111	55.5	55.5	55.5
	Female	89	44.5	44.5	100.0
	Total	200	100.0	100.0	

Table 13. What is your age range?

		Frequency	Percent	Valid percent	Cumulative percent
Valid	18-21 years	26	13.0	13.0	13.0
	22-25 years	70	35.0	35.0	48.0
	26-29 years	96	48.0	48.0	96.0
	30 years and above	8	4.0	4.0	100.0
	Total	200	100.0	100.0	

Table 13 shows the age group of the respondents in the study. As revealed, there are 96 respondents between 26-29 years (48.0%) followed by 35% within the age of 22-25 while 8 are 30 years and above. This implies that most of the respondents are between 26 and 29 years old.

Table 14. What is your academic level?

		Frequency	Percent	Valid percent	Cumulative percent
Valid	100 level	62	31.0	31.0	31.0
	200 level	15	7.5	7.5	38.5
	300 level	64	32.0	32.0	70.5
	500 level	59	29.5	29.5	100.0
	Total	200	100.0	100.0	

Table 14 shows the academic level of the respondents in the study. As revealed, there are 59 respondents in the 500 level, 64 respondents in the 300 level, 15 respondents in the 200 level, and 62 respondents in the 100 level. This implies that most of the respondents are at 300 levels.

Table 15. Occupation.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Student	105	52.5	52.5	52.5
	Staff member	95	47.5	47.5	100.0
	Total	200	100.0	100.0	

Table 15 shows the occupations of respondents in the study. As revealed, there are 105 student respondents (52.5%) and 95 staff respondents (47.5%). This implies that student respondents are more likely to be staff respondents.

From Figure 1, most respondent overall learning experience in the lecture room were excellent.

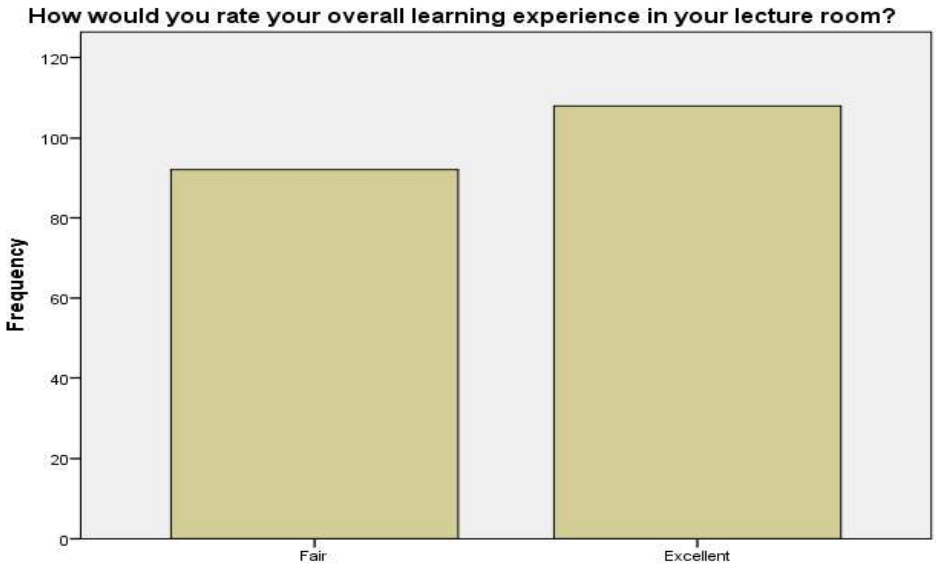

Figure 1. How would you rate your overall learning experience in your lecture room?

Chi-Square Test

Test of Hypotheses

H_0: There is no significant impact of landscape components on user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria.

H_1: There is a significant impact of landscape components on user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria (Table 16).

Table 16. How would you rate your overall learning experience in your lecture room?

	Observed N	**Expected N**	**Residual**
Fair	92	100.0	-8.0
Excellent	108	100.0	8.0
Total	200		

Table 17. Test statistics.

	How would you rate your overall learning experience in your lecture room?
Chi-square	1.280[a]
df	1
Asymp. sig.	.258

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 100.0.

Decision Rule

Because the Chi-square value is 1.280 and the calculated p-value is 0.258, which is less than the 95% confidence level (0.05), the researcher rejects the null hypotheses in Table 17, which claims that there is no significant impact of landscape components on user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria. The alternative hypotheses, which contends that landscape elements significantly affect user wellbeing in lecture rooms at the School of Agriculture and Agricultural Technology, Futminna, Nigeria, is thus accepted.

CONCLUSION AND RECOMMENDATION

In summary, the layout of learning environments, such as classrooms, has a big influence on how well students learn and feel about themselves. The physical aspects of a classroom, including the lighting, temperature, seating configurations, and décor, can affect how students think, feel, and act. One important element that has been shown to have a favorable impact on both student well-being and academic achievement is the use of natural components, such as plants and natural light. Studies have indicated that being in green spaces might have a favorable effect on mental health by lessening the symptoms of depression and anxiety. Adding natural features to classrooms can boost motivation, engagement, and happiness in the educational setting. Both indoor and outdoor environments with views of nature benefit mental health and wellness by lowering stress and raising happy feelings. Students' motivation and engagement levels might rise when natural elements are incorporated into learning spaces. In order to enhance student wellness and academic performance, educators, and designers are advised to include natural elements and outside views in educational environments.

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