ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

Landscape Impact on Mental Restoration in Campuses

Aakash Reddy[1]; Deepika Raina[2]

[1](SRN: PES1UG20BA037)
Bengaluru- 560085

[2]Guide
Designation
Faculty of Architecture
PES University
Bengaluru- 560085

PES UNIVERSITY
(Established under Karnataka Act No. 16 of 2013)
100-ft Ring Road, Bengaluru – 560 085, Karnataka, India

Publication Date: 2025/06/04

How to Cite: Aakash Reddy; Deepika Raina (2025), Landscape Impact on Mental Restoration in Campuses. *International Journal of Innovative Science and Research Technology*, 10(5), 2832-2855. https://doi.org/10.38124/ijisrt/25may610

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

TABLE OF CONTENTS

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

CHAPTER ONE
INTRODUCTION

People in general undergo stress, mental fatigue is a major factor that affects individuals, research papers have suggested that nature has a positive effect on mental fatigue (the experience of nature, rachel kapaln). Students in universities undergo this mental fatigue due to interpersonal conflicts, time constraints, travelling distances, financial constraints and other various factors. The design of a campus extends beyond simply providing a space for studying. It should also have a healing aspect, addressing both functional and psychological needs. Open spaces between buildings help create a sense of direction by connecting and structuring different areas and elements. Additionally, they contribute to the campus's aesthetic appeal by incorporating pleasant surroundings and offering visual surprises.

- *Aim*

This paper will review and explain strategies and intentions of landscape design in a campus, additionally explains the health benefits of each green design along with its importance in a urban design context. University students undergo a lot of stressors, landscape and greenery have a huge psychological effect on students. many corresponding design approaches (landscape design, spatial design and green design) will also be explained. Two case studies of universities with diverse landscape design approaches will be compared side by side to understand the challenges and approaches needed to make it suitable for campus designs.

- *Objective*

To study and understand the positive impact that landscape has on students in a campus that undergo mental fatigue due to various factors, To explain the need for these spaces as vital gathering and revitalising spaces that will help students have a better experience and also make landscape a important element in universities.

- *Significance*

Landscape design plays a crucial role in creating sustainable and health-supportive campus environments. Natural spaces on campuses offer significant mental health benefits for students and staff, helping alleviate stress and promote well-being (Lau, S. S. Y., Gou, Z., & Liu, Y. (2014). Healthy Campus by Open Space Design: Approaches and Guidelines.). Students show a strong preference for campus landscapes that include vegetation, seating areas, and water features. open spaces with lawns and grass are particularly favoured, while hardscaped areas are less preferred (Hami, A., & Abdi, B. (2019). Students' landscaping preferences for open spaces for their campus environment. Indoor and Built Environment).

- *Scope*

Landscape design plays a crucial role in creating sustainable and health-supportive campus environments. It encompasses various aspects such as healing gardens, flexible spaces, and green buildings that incorporate open spaces as catalysts for integrated ecosystems Lau, S. S. Y., Gou, Z., & Liu, Y. (2014)).

The application of landscape design in campuses is particularly important for alleviating stress and promoting mental health among students and staff.

The scope of landscape design in campuses will help to create diverse open spaces that satisfy different purposes. These include waterfront spaces, vegetation spaces, courtyard spaces, and square spaces, each offering varying degrees of perceived attention restoration effects.

- *Limitations*

In compact urban settings, high-density surroundings may limit the size of open spaces and hinder circulation and accessibility. This constraint can make it challenging to implement extensive landscape designs or create large green areas. However, smaller open spaces may provide more intimate contact with natural restorative elements and offer a more controllable microclimate for physical comfort. The effectiveness of landscape design can be influenced by user preferences and perceptions, which may vary across different demographics. For instance, students' preferences for landscaping differ between open study areas and leisure spaces. This variability necessitates a careful balance in design approaches to cater to diverse needs. While natural spaces are beneficial for mental health, the application of healing gardens in compact campus designs may be limited by available space and resources. Additionally, the impact of such designs on actual health outcomes and behaviour changes remains a question open to further research.

- *Data Collection*

Case studies and comparative analyses compared three university campuses with different urban contexts will be used to identify challenges and opportunities in applying various design approaches. The case studies will help to examine the use pattern of green spaces in a compact built setting.

- *References*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

RESEARCH PAPERS
(Lau, S. S. Y., Gou, Z., & Liu, Y. (2014)
(Hami, A., & Abdi, B. (2019)

➢ *Articles*

"Impact of views to school landscapes on recovery from stress and mental fatigue" authored by Bin Jiang and William C. Sullivan and published in Landscape and Urban Planning in 2016

"Investigating the Mental Health Impacts of University Campus Green Spaces", authored by Paulina Jenifer Gascon, Roser Marquet, and collaborators from the GREENSENSE project team, published in Frontiers in Public Health in 2020

"How university blue and green space affect students' mental health: A systematic review" was authored by Serena Lee, Alessio Russo, Zoe M. Jenkin, and Brenda Vale

➢ *Design Aspects*

- *Healing Garden*

The belief that observing vegetation, water, and other natural elements can alleviate stress is well-supported. The restorative effects of these landscape elements highlight their therapeutic potential, helping to reduce cognitive fatigue and other stress-related factors. The benefits include:

✓ Shorter post-operative hospital stays.
✓ Restorative benefits for heart rate data and emotional states
✓ Less job stress and intention to quit
✓ Lower mental fatigue
✓ Higher happiness, lower stress, anger, depression and tension
✓ Shorter post-operative hospital stays.
✓ Restorative benefits for heart rate data and emotional states
✓ Less job stress and intention to quit
✓ Lower mental fatigue
✓ Higher happiness, lower stress, anger, depression and tension
✓ Shorter post-operative hospital stays.
✓ Restorative benefits for heart rate data and emotional states
✓ Less job stress and intention to quit
✓ Lower mental fatigue
✓ Higher happiness, lower stress, anger, depression and tension

- *References*

Ulrich (1984)
heerwagen (1980)
leather et al (1998)
kuo et al (1998)
van den berg (2007)

➢ *Landscape Design*

Restorative design incorporates elements such as retreat, fascination, and exposure to nature. Certain environments, including religious sanctuaries, hospitals, and other therapeutic spaces, are intentionally designed to promote restoration, uplifting the human spirit and supporting healing.

People engage with their surroundings through sight, touch, sound, and smell. Thoughtful design that considers these sensory experiences can enhance individuals' connection to a place. For visual perception, a diverse and dynamic arrangement of plant colours, textures, and patterns can enhance a garden's aesthetic appeal, while a densely planted flower border can create the illusion of a larger space by influencing the perception of depth and design.

➢ *Architectural Simulation*

Architectural stimulation refers to the level of information in a space that impacts its users. Humans perform best with moderate stimulation, while both insufficient and excessive stimulation can lead to sensory deprivation or distraction. Achieving an optimal level of stimulation depends on key architectural factors such as layout, circulation, control, flexibility, responsiveness, privacy, spatial syntax, defensible space, and symbolic elements (Evans & McCoy, 1998; Garling et al., 1986; Stokols, 1992).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

Limited spatial resources, rigid spatial arrangements, and inadequate climatic controls can hinder individuals' ability to effectively engage with a space.

➢ *Green Building and Ecosystems*

In green building design, open space functions as a micro-ecosystem by supporting vegetation and wildlife, creating a favourable microclimate for users, and enhancing stormwater infiltration into the soil and land (Hamin & Gurran, 2009). In a campus setting, integrating sustainable open spaces can serve as a valuable educational resource, promoting learning about natural systems, biodiversity, and various ecological and environmental science topics (USGBC, 2010).

For the sense of touch, the special texture of plants can draw people to touch them, and waxy leaves and fluffy flowers can encourage direct interaction between people and natural elements. For the sense of sound, soft sounds in an enclosed area would bring in a sense of serenity and can create a natural symphony that brings relief to people.

➢ *Spatial Design*

- *Courtyard*

A courtyard, as an open space enclosed by buildings, provides natural stimulation by offering scenic views to its surroundings. Serving as a passage for students and teachers on their way to class, courtyards become integral to daily campus movement. When in a hurry, individuals can take a diagonal path through the courtyard, making direct contact with the space. This frequent use enhances engagement with the courtyard, fostering interaction and a sense of connection with the environment.

- *Circulation*

An open space links various areas of a campus through an axial street, establishing a strong spatial structure. However, circulation spaces serve more than just transportation; well-planned circulation helps regulate overstimulation by reducing exposure to noise and congestion. A sequence of open spaces can integrate different areas into a cohesive system, fostering a sense of order and direction. The axial design enhances connectivity, ensuring efficient movement while seamlessly linking different parts of the campus.

- *Privacy*

Privacy nooks and stimulus shelters can help mitigate the stressful effects of excessive stimulation. Different users have varying spatial needs—some seek privacy, while others prefer openness. Small group discussions may require enclosed spaces for confidential conversations, while large gatherings during special events necessitate expansive areas. Open spaces also support outdoor leisure activities, offering a break from sedentary routines. Prolonged sitting and reading in the same posture can negatively impact health and vision, but open spaces provide opportunities for movement, relaxation, and exercise, helping to alleviate daily life stresses.

- *Lawns*

Whenever possible, maintaining or cultivating a lawn area is beneficial, as the sight of lush greenery is widely appreciated. Lawns contribute to a vibrant natural environment while also serving as versatile spaces for recreation, offering a welcoming playing surface for users of all ages.

Restorative design incorporates elements such as retreat, fascination, and exposure to nature. Certain environments, including religious sanctuaries, hospitals, and other therapeutic facilities, are intentionally designed to foster restoration. These spaces can uplift the human spirit and support the healing process.

- *Trees*

Planting trees that are already large or will grow to a substantial size at maturity is highly beneficial, as people respond positively to them. Their striking presence can serve as a focal point in a landscape, while the ample shade provided by their broad canopies is one of the most valued features in outdoor spaces.

- *Colorful Plants*

Incorporating colour variation in planting, particularly through flowers, is an effective way to attract people. Vibrant colours and floral displays enhance visual appeal and create an inviting atmosphere. Research suggests that landscapes featuring flowers play a significant role in improving mood and alleviating feelings of discouragement.

- *Interaction*

Open spaces serve as versatile areas for both planned and spontaneous activities within a natural setting. Integrating landscape elements that foster interaction can enhance user engagement, encouraging people to actively connect with and utilize these spaces.

➢ *Green Design*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

- *Water Garden*

A water or rain garden is a type of open space designed for stormwater management. It features deep-rooted native plants and grasses that capture rainwater runoff, preventing excess water from entering the sewer system. This natural filtration process enhances groundwater quality. Additionally, water gardens serve as valuable learning environments, offering opportunities for exploring natural habitats and studying aquatic ecology.

- *Eco-System*

The goal of integrating an ecosystem within the built environment is to establish a natural support system that sustains life without depleting environmental resources. A self-sufficient garden not only reduces negative impacts on the surrounding environment but also enhances the local ecosystem by promoting carbon dioxide—oxygen exchange and increasing biodiversity among plants and animals.

- *Microclimate*

Temperature and light are essential factors in shaping a microclimate. Natural lighting reduces reliance on artificial lighting, which generates heat as a by-product. It also enhances productivity and well-being in schools while lowering maintenance costs. Similarly, natural ventilation introduces fresh air, improving indoor air quality.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

CHAPTER TWO
LITERATURE STUDY

➢ *Green Design and Mental Restoration*

Study Example: The Influence of Green Spaces on Stress Recovery

- *Study:*

A study by Ulrich (1984) demonstrated that individuals exposed to natural views (e.g., greenery, trees) had significantly lower stress levels, indicated by a faster recovery from physiological stress (measured through blood pressure and heart rate).

- *Data:*

After exposure to a green view, patients who had undergone surgery recovered faster, with a 10% reduction in pain and discomfort compared to those who faced brick walls.

- *Conclusion:*

Greenery helps in cognitive restoration by reducing mental fatigue and boosting attention restoration.

Data from the Urban Green Space and Health (2016) Study:

- *Study:*

The Urban Green Space and Health report from the World Health Organization (WHO) showed that individuals who spent at least 20 minutes per day in green spaces reported higher levels of mood improvement, lower stress, and enhanced emotional well-being.

- *Data:*

The report indicated a 20% improvement in overall mood after short durations of time spent in nature.

- *Conclusion:*

The presence of green space plays a significant role in reducing cortisol levels and mitigating stress.

➢ *Spatial Design and Mental Restoration*

- *Study Example:*

Impact of Spatial Design on Mental Well-Being

- Study:

A study by Kaplan and Kaplan (1989) in their Perception and Preference Theory suggests that the spatial design of landscapes plays a role in restoring mental fatigue and improving psychological attention.

- *Data*:

Kaplan found that environments with visual complexity, natural elements, and pathways enhance cognitive recovery, providing a more restorative environment.

- *Conclusion:*

Spaces with clear navigational paths, views of natural landscapes, and open areas lead to improved attention restoration and overall mental clarity.

➢ *Data from the Study on Urban Spatial Design and Well-Being (2017):*

- *Study:*

The Royal Institute of British Architects (RIBA) study examined the impact of spatial configuration on emotional well-being in urban areas.

- *Data:*

Participants who lived in areas with high spatial connectivity (i.e., well-planned streets with access to parks) reported 30% lower stress levels than those in poorly planned urban spaces.

- *Conclusion:*

Effective spatial organization, such as interconnected green corridors, improves spatial accessibility and mental relaxation.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *Landscape Design and Mental Restoration*

- *Study Example:*
  Biophilic Design and Its Impact on Mental Restoration

- *Study:*
  A study by Browning et al. (2014) explored how biophilic design (which integrates natural elements into urban spaces) contributes to mental restoration and well-being.

- *Data:*
  Offices with natural light, greenery, and natural materials reported a 15-20% increase in worker productivity and a 12% reduction in reported stress levels.

- *Conclusion:*
  Landscape elements like green walls, water features, and natural lighting can have a direct positive impact on psychological well-being by creating restorative environments that reduce stress and improve mood.

- *Data from the Nature and Mental Health:*
  An Ecosystem Service Perspective (2015):

- *Study:*
  A meta-analysis on the impact of landscape design (natural features, landscaping, etc.) on mental health found that individuals who spent time in restorative landscapes (forests, parks) exhibited significant reductions in anxiety and depression.

- *Data:*
  Mental health improvements were quantified at 19-40% improvement in anxiety and 20-35% improvement in mood when people interacted with green spaces compared to urban environments without natural features.

- *Conclusion:*
  Incorporating landscape elements such as natural vegetation, water features, and pathways into design can help in mental restoration by reducing stress and improving cognitive recovery.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

CHAPTER THREE
CASE STUDIES

➢ *Hong Kong University*

Table 1 Assigning Design Elements for Open Spaces of Hong Kong University

SELECTED OPEN SPACES AND SURROUNDINGS	LANDSCAPE DESIGN	SPATIAL DESIGN	GREEN DESIGN
 Fig 1.A  Fig 1.B	Trees Ponds Fountain	A small courtyard for privacy	Microclimate (shading)
 Fig 1.C  Fig 1.D	Lawn Trees Dense planting	courtyard for circulation	Microclimate (Sunny and shade)
 Fig 1.E  Fig 1.F	Colourful plants Trees Dense Ponds	Circulation	Ecosystem (birds, fishes, etc.)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

 Fig 1.G  Fig 1.H	Colourful plants Facilities	Main circulation	N/A
 Fig 1.I  Fig 1.J	Natural views	Main circulation	Microclimate (shading)

➢ *Inference of Images*

- *Fig 1.A And Fig 1.B*

The images display a water feature surrounded by trees in a smaller enclosed area. From a landscape design perspective, there is intentional use of trees, ponds, and fountains to create visual interest and natural ambiance. The spatial design creates a small, intimate courtyard that offers privacy and a retreat space for students seeking solitude. In terms of green design, the trees provide natural shading, creating a cooler microclimate within the dense urban Hong Kong environment.

- *Fig 1.C And Fig 1.D*

These images showcase a lawn area with surrounding trees and dense planting. The landscape design combines open lawn with dense tree planting, creating visual contrast and offering flexible usage options. The spatial design functions as a courtyard space designed for circulation and transition between buildings. The green design creates varied microclimates with both sunny and shaded areas, giving users environmental options based on weather conditions.

- *Fig 1.E And Fig 1.F*

The images feature colorful plants, trees, and water features. The landscape design incorporates visually stimulating colorful plants and ponds, demonstrating aesthetic variety. From a spatial design perspective, the area functions as a circulation space that guides movement through the campus. The green design follows an ecosystem approach, with the space supporting biodiversity through features that attract birds, fish, and other wildlife.

- *Fig 1.G And Fig 1.H*

These images show colorful plants along with campus facilities or structures. The landscape design uses colorful plants to enhance the aesthetic appeal along a circulation route, adding visual interest. The spatial design clearly functions as a main circulation pathway that connects different areas of the campus. No specific green design elements are identified in these images, suggesting this area focuses more on circulation functionality than ecological purposes.

- *Results or Findings*

The landscape interventions successfully enhanced the campus's ecological value, improved walkability, and created more engaging communal areas. It also strengthened HKU's identity as a green, pedestrian-friendly university while setting a benchmark for landscape design in dense urban contexts.

- *Main Issue or Challenge*

Hong Kong University (HKU) faced the challenge of integrating effective landscape design within a highly urbanized, hilly environment. The goal was to create functional, sustainable, and aesthetic outdoor spaces for students, staff, and visitors, despite space limitations and complex site conditions.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

- *Methodology Used*

The project adopted a site-sensitive and sustainability-driven design approach. Designers conducted environmental analyses, including studies of topography, microclimate, and pedestrian flow. They emphasized native planting, water-sensitive urban design, and adaptive reuse of existing structures.

- *Relevance*

Informing Research Questions:

➢ *Based on the Findings, Anticipated Outcomes of Incorporating Restorative Landscapes Include:*

- Improved mental health and reduced stress among urban dwellers.
- Enhanced cognitive functioning and attention restoration.
- Greater community engagement and social well-being.

➢ *This Case Study Prompts Inquiries Into:*

- Which specific landscape features most effectively promote mental restoration?
- How do urban residents interact with green spaces, and what are the psychological outcomes?

➢ *Informing Methodology:*

The initiative demonstrates the value of combining qualitative and quantitative research methods, including:

- Surveys and interviews to gather subjective experiences.
- Physiological measurements to assess stress levels.
- Spatial analysis to understand the distribution and accessibility of green spaces.

➢ *Strengths*

- *Multidisciplinary Approach:*

By integrating environmental psychology, urban planning, and landscape architecture, the study captures the complex interactions between people and their environments.

- *Use of Innovative Methods:*

Incorporating virtual reality simulations allows for controlled experimentation on landscape perception, which strengthens the reliability of the findings.

- *Empirical Evidence:*

The initiative provides both subjective (survey, interviews) and objective (physiological stress measures) data, creating a more holistic understanding of how green spaces influence mental health.

- *Urban Relevance:*

In a highly urbanized setting like Hong Kong, the study's findings are particularly important for cities with limited space and high population density, making its insights broadly applicable.

➢ *Weaknesses*

- *Limited Real-World Testing:*

Although VR studies are useful, they may not fully replicate the complexity of real-world experiences, where factors like air quality, soundscape, and social interactions also influence mental restoration.

- *Cultural Specificity:*

The findings are based heavily on Hong Kong's urban and cultural context. This may limit generalizability to cities with different social behaviors, environmental conditions, or cultural attitudes toward nature.

- *Short-Term Observation:*

Much of the evidence seems to come from immediate or short-term studies (e.g., after a park visit or VR experience), leaving open the question of long-term mental health benefits from urban green spaces.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *Contribution To Broader Understanding*

- *Expands Theoretical Models:*
  It reinforces theories like Attention Restoration Theory (ART) and Stress Recovery Theory (SRT) by providing urban-specific empirical support.

- *Informs Urban Planning:*
  It strengthens the argument that mental health should be a key goal in urban landscape design, not just an environmental or aesthetic concern.

- *Demonstrates Technological Potential:*
  The use of VR shows how new technologies can help researchers simulate and study landscape experiences without needing full-scale, real-world interventions first.

➢ *Gaps And Limitations*

- *Lack of Longitudinal Data:*
  There's no strong evidence showing how sustained exposure to restorative landscapes impacts mental health over months or years.

- *Underexplored Demographic Differences:*
  Differences based on age, gender, income, or existing mental health conditions are not deeply addressed, even though these can affect how people perceive and benefit from green spaces.

- *Environmental Variables:*
  Factors like temperature, noise, and pollution that also impact mental restoration in real-world parks were not fully integrated into the study's analysis.

➢ *University of New South Wales*

Table 2 Assigning Design Elements for Open Spaces of New South Wales University

SELECTED OPEN SPACES AND SURROUNDINGS	LANDSCAPE DESIGN	SPATIAL DESIGN	GREEN DESIGN
 Fig 2.A  Fig 2.B	Lawns Trees Facilities Lawns	A large Courtyard for easy accessibility and circulation	N/A
 Fig 2.C  Fig 2.D	Lawns Trees Sculpture	Main circulation	N/A

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

 Fig 2.E  Fig 2.F		Lawns Trees Sculpture	A large Courtyard for easy accessibility and circulation	N/A
 Fig 2.G  Fig 2.H		Lawns Trees	Main circulation	N/A
 Fig 2.I  Fig 2.J		Lawns	A large space to separate the campus and the outside	N/A

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *Inference of Images*

- *Fig 2.A And Fig 2.B*

These images show large lawn areas with trees and facilities. The landscape design features open lawn spaces with strategically placed trees, creating a simple but functional landscape. The spatial design reveals a large courtyard that facilitates easy accessibility and circulation between campus buildings. No specific green design elements are identified, suggesting this is primarily a functional space without specialized ecological features.

- *Fig 2.C And Fig 2.D*

These display lawns, trees, and what appears to be a sculpture. The landscape design integrates sculptural elements with natural features, creating visual interest and landmarks. The spatial design appears to be a main circulation route through the campus. No specific green design strategies are evident in these images.

- *Fig 2.E And Fig 2.F*

These images show large courtyard spaces with lawns, trees, and sculptural elements. The landscape design combines lawns, trees, and sculptural elements to create a clean, usable space. The spatial design features a large courtyard that prioritizes accessibility and circulation between buildings. No specific green design elements are apparent in these images.

- *Fig 2.G And Fig 2.H*

These show lawn areas with trees along pathways. The landscape design takes a minimalist approach using primarily lawns and trees to create a clean, open aesthetic. The spatial design functions as a main circulation route connecting different parts of the campus. No specific green design strategies are evident in these images.

- *Fig 2.I And Fig 2.G*

These depict a large open lawn area that appears to create a buffer zone. The landscape design employs a simple lawn design, creating an open, flexible space. The spatial design indicates this large space functions as a buffer or transition zone between the campus and outside areas. No specific green design strategies are identified in these images.

➢ *Main Challenges*

- *Urbanization Pressure:*

Limited green spaces in South Wales urban environments made it challenging to create restorative natural areas accessible to university communities and local youth.

- *Mental Health Crisis:*

Rising mental health issues, especially among young people, created urgency for alternative, nature-based interventions.

- *Accessibility and Engagement:*

Ensuring that nature spaces are not only available but also inviting and mentally restorative for diverse populations.

➢ *Research Methodology*

- *Co-Production with Youth:*

Students and young people were involved in designing and shaping interventions (like green workshops, nature walks) to better match their needs and interests.

➢ *Mixed-Methods Approach:*

- *Qualitative:*

Interviews and focus groups captured students' subjective experiences with landscape spaces.

- *Quantitative:*

Mental health surveys before and after nature exposure measured stress, mood, and attention improvements.

- *Pilot Interventions:*

Small, local nature engagement programs (e.g., green exercise, mindfulness in parks) were tested within school and university settings.

➢ *Results and Findings*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

- *Positive Psychological Impact:*
  Students reported reduced stress, improved mood, and a greater sense of calm after nature-based activities.

- *Increased Awareness:*
  Participants became more conscious of how green environments affect their mental well-being.

- *Barriers Identified:*
  Lack of time, limited transport to green spaces, and initial skepticism about the value of nature activities were key obstacles.

- *Recommendations for Practice:*
  Design urban green spaces that are easily accessible, youth-friendly, and integrated into daily routines (e.g., green pathways to and from campuses).

➢ *Relevance*

- *Informing Research Questions:*
  The Sydney Park project highlights how naturalized urban landscapes — particularly those integrating water features, biodiversity, and recreational areas — contribute to mental well-being. It suggests research questions like:

✓ How do designed natural spaces affect stress recovery and cognitive restoration?
✓ What landscape features (e.g., water bodies, native vegetation) are most effective for promoting mental health benefits?
✓ Informing Methodology: The case study supports a mixed-methods research approach combining:
✓ Quantitative data, such as park usage statistics, biodiversity counts, and water quality measurements.
✓ Qualitative methods, such as visitor surveys, interviews, and observational studies, to capture emotional and psychological responses to the environment.

➢ *Strengths*

- *Youth-Centered Design:*
  Involving young people in co-creating the interventions ensures that the strategies are relevant, engaging, and culturally appropriate for the target population.

- *Mixed-Methods Research:*
  Combining quantitative mental health data with qualitative personal experiences gives a rich, nuanced understanding of how landscapes influence mental restoration.

- *Real-World Application:*
  The interventions were tested in actual school and university settings, making the findings directly applicable to education and urban planning sectors.

- *Focus on Preventative Mental Health:*
  Rather than treating mental illness after onset, the project emphasizes early intervention and prevention through nature engagement — a progressive and cost-effective approach.

➢ *Weaknesses*

- *Limited Long-Term Evaluation:*
  Most outcomes were measured shortly after interventions; there's little evidence showing sustained benefits over months or years.

- *Sample Diversity:*
  The participants may not fully represent broader demographics (e.g., students from rural areas, different socioeconomic backgrounds, or varying mental health baselines).

- *Scalability Challenges:*
  What works well in South Wales (with its specific geography and community setup) may not easily scale to different urban or cultural contexts without significant adaptation.

- *Environmental Factors Overlooked:*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

The study mostly focused on access to green spaces but less on quality of spaces (e.g., biodiversity, safety, noise levels), which are crucial for mental restoration outcomes.

➢ *Contribution To Broader Understanding*

- *Strengthens Nature-Mental Health Link:*
  Reinforces existing theories like Attention Restoration Theory (ART) and Stress Recovery Theory (SRT) by showing that even modest urban green interventions can have measurable mental health benefits.

- *Emphasizes Participatory Design:*
  Highlights the importance of co-producing landscape interventions with the community, rather than imposing top-down designs.

- *Guides Policy and Education:*
  Provides practical evidence for policymakers and educators to integrate green space engagement into mental health strategies and educational curricula.

➢ *Gaps And Limitations*

- *Long-Term and Seasonal Effects:*
  The study doesn't address how different seasons (e.g., winter vs. spring) might affect the restorative impact of landscapes over time.

- *Detailed Mental Health Metrics:*
  It would benefit from using more clinical mental health measures (e.g., anxiety scales, cortisol levels) to strengthen its psychological claims.

- *Missing Economic Analysis:*
  The cost-effectiveness of implementing widespread nature-based interventions wasn't explored — an important factor for large-scale policy adoption.

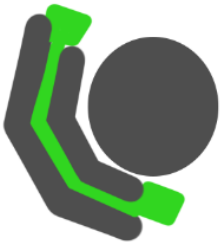
Emphasizes the value of participatory approaches in designing effective mental health programs.

- *Providing a Model for Future Initiatives:*
  The project's framework can serve as a blueprint for similar programs aiming to integrate nature engagement into mental health strategies for youth.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *University Of Melbourne*

Table 3 Assigning Design Elements for Open Spaces of University of Melbourne

SELECTED OPEN SPACES AND SURROUNDINGS	LANDSCAPE DESIGN	SPATIAL DESIGN	GREEN DESIGN
 Fig 3.B 	Lawns and trees	Main circulation and social gathering	N/A
 Fig 3.C  Fig 3.D	Plants and trees	Across campus	Microclimate (ecosystem)
 Fig 3.E  Fig 3.F	Lawns and trees	Between blocks	Microclimate (shading)
 Fig 3.G  Fig 3.H	Trees and plants	Across campus	Microclimate (shading)

➢ *Inference Of Images*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

- *Fig 3.A And Fig 3.B*

These display lawn areas with trees that appear to be in a central area. The landscape design makes simple but effective use of lawns and trees to create an inviting space. The spatial design appears to function as both a main circulation route and social gathering space. No specific green design strategies are evident in these images.

- *Fig 3.C And Fig 3.D*

These show plants and trees distributed across the campus. The landscape design incorporates diverse plant selection and trees, creating visual interest throughout the campus. The spatial design integrates vegetation across the campus rather than confining it to specific areas. The green design supports the campus microclimate and appears to contribute to the local ecosystem.

- *Fig 3.E And Fig 3.F*

These images show lawns and trees between campus buildings. The landscape design strategically places lawns and trees to create usable green spaces between buildings. The spatial design uses these green areas to connect separate buildings and create transitions between spaces. The green design utilizes trees to provide valuable shading, improving the microclimate between buildings.

- *Fig 3.G And Fig 3.H*

These display trees and plants throughout the campus. The landscape design makes consistent use of trees and plants to create visual cohesion across the campus. The spatial design distributes vegetation throughout the campus, supporting overall connectivity. The green design uses trees to provide important shading, contributing to microclimate management across the campus.

➢ *Main Challenges*

- *Urban Heat Island Effect:*

The University of Melbourne, like many urban campuses, faces challenges with urban heat due to limited green spaces, leading to stress and discomfort among students, faculty, and staff.

- *Student Mental Health Crisis:*

Increased levels of student stress, anxiety, and depression are a significant issue, particularly during exams or major academic deadlines.

- *Space Utilization and Design:*

Balancing academic spaces with relaxation spaces and providing environments that facilitate both cognitive restoration and social interaction remains a significant challenge.

➢ *Research Methodology*

- *Field Studies:*

Observational Studies in green and built environments on campus to assess student behaviour, engagement, and psychological responses.

Use of salivary cortisol tests (a biological stress marker) and heart rate variability (HRV) to objectively measure stress levels.

- *Survey and Interviews:*

Surveys administered to students to collect self-reported data on stress levels, perceived well-being, and preferences for green spaces on campus.

Semi-structured interviews to understand personal experiences and the psychological impact of landscape design.

- *Experimental Green Space Interventions:*

Several interventions, such as the addition of green rooftops and community gardens, were tested, with pre- and post-intervention surveys to measure mental health improvements.

➢ *Results And Findings*

- *Reduction in Stress:*

Students who spent time in newly designed green spaces reported a reduction in perceived stress and an increased sense of well-being and calm compared to students who used built or non-green areas.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

- *Increased Cognitive Restoration:*
  Exposure to natural elements, such as trees and water features, showed improvements in focus and attention, supporting Attention Restoration Theory (ART).

- *Social Interaction Enhancement:*
  Green spaces promoted social interaction and community-building among students, contributing to social cohesion and reducing feelings of isolation.

- *Sustained Impact on Mood:*
  Positive effects on mood and stress reduction were found to be long-lasting, particularly when students used the spaces regularly (e.g., weekly).

➢ *Critical Analysis of the Case Study*

- *Strengths*

✓ *Holistic Approach:*
By combining biological, psychological, and social measures, the study provides a comprehensive understanding of the effects of green spaces on mental restoration.

✓ *Practical and Scalable:*
The interventions tested on the University of Melbourne campus (e.g., green rooftops, gardens) can be scaled to other urban campuses or public spaces with similar urban heat and mental health challenges.

✓ *Robust Methodology:*
Using both quantitative (biological measurements) and qualitative (interviews, surveys) methods allows for multi-dimensional analysis of how green spaces impact mental well-being.

➢ *Weaknesses*

- *Generalizability:*
  The study's focus on one university setting may not fully account for differences in local climates, cultural practices, or socioeconomic factors that can affect the restoration potential of green spaces elsewhere.

- *Short-Term Focus:*
  Like many similar studies, it lacks long-term follow-up beyond the immediate effects of green space interventions, leaving open the question of sustained mental health benefits over the long term.

- *Limited Diversity in Participants:*
  The study may not include a sufficiently diverse group of students, which could limit its applicability to different populations, especially those with varying mental health profiles.

➢ *Contribution To Broader Understanding*

- *Support for Nature-Based Interventions:*
  This case study adds to the growing body of evidence showing that urban green spaces are valuable not only for environmental reasons but also as psychological interventions for mental health challenges.

- *Highlighting the Importance of Design:*
  It underscores that it's not just about having any green space, but about thoughtful, inclusive landscape design that accounts for how people will interact with the space.

- *Interdisciplinary Benefits:*
  This study encourages collaborations across disciplines (e.g., landscape architects, urban planners, psychologists, and biologists) to create environments that foster social well-being and mental restoration.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *Gaps And Limitations*

- *Missing Long-Term Data:*
  Like many similar studies, the findings rely heavily on short-term observations. The long-term benefits of green spaces, such as how they affect students after a year of use, are not well-documented.

- *Environmental Factors Not Fully Accounted For:*
  While the study measures human engagement with green spaces, it doesn't delve deeply into how other environmental variables (e.g., noise pollution, light exposure, temperature) affect the restorative qualities of these landscapes.

- *Limited Consideration of Socioeconomic Diversity:*
  The study may benefit from a deeper exploration into how students from diverse socioeconomic backgrounds interact with and benefit from green spaces, as these groups might have different needs, access issues, and expectations.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

CHAPTER FOUR
COMPARATIVE ANALYSIS

➢ *Design Approach Comparison*

Table 4 Design Approach Comparison

UNIVERSITY	LANDSCAPE APPROACH	SPATIAL APPROACH	GREEN DESIGN APPROACH
Hong Kong University	Emphasis on diverse elements including trees, ponds, fountains, and colorful plants	Focus on privacy courtyards and circulation pathways	Strong focus on microclimate management and ecosystem development
New South Wales University	Predominant use of lawns, trees, and sculptures	Large courtyards and open circulation spaces	Limited explicit green design strategies
University of Melbourne	Balance of lawns, trees, and plant variety	Mix of main circulation areas and inter-building spaces	Focus on microclimate management, especially shading

➢ *Key Findings from Comparison*

- *Contextual Adaptation:*
  Each university has adapted its landscape design approach to its specific urban context, with Hong Kong University implementing the most diverse set of elements to address its dense urban setting.

- *Functional Priorities:*
  While all three universities prioritize circulation in their spatial design, Hong Kong University places greater emphasis on privacy spaces, while New South Wales and Melbourne focus more on large gathering areas.

- *Green Design Integration:*
  Hong Kong University demonstrates the most comprehensive integration of green design principles, incorporating ecosystem considerations alongside microclimate management.

- *Space Utilization:*
  The University of Melbourne shows effective use of inter-building spaces for green areas, whereas New South Wales University emphasizes larger, more open spaces.

- *Mental Health Considerations:*
  All three case studies acknowledge the impact of landscape design on student mental health, but their implementation approaches vary according to their specific challenges and resources.

➢ *Effectiveness for Mental Restoration*

- *Hong Kong University:*
  The diverse landscape elements and focus on private courtyards may provide more effective spaces for mental restoration by offering varying levels of stimulation and privacy.

- *New South Wales University:*
  The emphasis on large, open lawns and sculptural elements creates spaces for social gathering and community building, which can address social aspects of mental wellbeing.

- *University of Melbourne:*
  The balanced approach between circulation and shaded areas provides practical everyday mental health benefits as students move through campus.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

➢ *Key Conclusions*

- *Mental Health Impact:*
  Landscape design in university campuses significantly affects student mental health, with natural elements consistently showing benefits for stress reduction and cognitive restoration.

- *Design Diversity:*
  A diverse approach to landscape design that incorporates various elements (water features, vegetation, open spaces) provides the most comprehensive mental health benefits.

- *Context Sensitivity:*
  Effective campus landscape design must be adapted to the specific urban context, climate conditions, and spatial constraints of each university.

- *Methodological Insights:*
  Mixed-methods approaches combining quantitative measures of mental health with qualitative user experiences provide the most comprehensive understanding of landscape design effectiveness.

➢ *Recommendations for Campus Landscape Design*

- *Integrated Planning:*
  Universities should integrate landscape design considerations from the earliest stages of campus planning, rather than treating them as aesthetic afterthoughts.

- *Student Involvement:*
  Engaging students in the design process through participatory approaches ensures that landscape elements meet their actual mental health and social needs.

- *Diverse Spaces:*
  Campus designs should incorporate a variety of space types, including private retreats, social gathering areas, and natural pathways to address different mental restoration needs.

- *Evidence-Based Design:*
  Landscape architects and campus planners should draw on the growing body of research on mental restoration to inform specific design choices.

- *Maintenance Planning:*
  Long-term maintenance strategies should be developed alongside initial design to ensure that restorative landscape elements remain effective over time.

➢ *Limitations of This Research*

- *Case Study Selection:*
  While the three selected universities provide diverse examples, they cannot represent the full range of campus contexts and design approaches globally.

- *Physical vs. Digital Documentation:*
  The analysis relies on documented images and descriptions, which may not fully capture the experiential qualities of these spaces.

- *Long-Term Impacts:*
  The research shares the limitation of the source studies in having limited information on long-term mental health impacts of these landscape designs.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

➢ *Directions for Future Research*

- *Longitudinal Studies:*
  Future research should investigate the long-term impacts of campus landscape design on student mental health over their entire academic career.

- *Cultural Variations:*
  More comparative studies are needed to understand how cultural factors influence the perception and use of restorative landscape elements.

- *Climate Adaptation:*
  Research on how landscape design strategies for mental restoration can adapt to changing climate conditions will become increasingly important.

- *Technology Integration:*
  Studies on how digital elements and technologies might complement natural landscape features for enhanced mental restoration could open new design possibilities.

- *Quantifiable Metrics:*
  Development of standardized metrics for assessing the mental restoration potential of campus landscapes would enable more consistent evaluation and improvement.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may610

REFERENCES

[1]. Browning, W. D., Ryan, C. O., & Clancy, J. O. (2014). 14 patterns of biophilic design: Improving health and well-being in the built environment. *Terrapin Bright Green LLC*.

[2]. Cooper, R., & Sachs, N. A. (2013). *Therapeutic landscapes: An evidence-based approach to designing healing gardens and restorative outdoor spaces*. John Wiley & Sons.

[3]. Evans, G. W., & McCoy, J. M. (1998). When buildings don't work: The role of architecture in human health. *Journal of Environmental Psychology, 18*(1), 85-94.

[4]. Hami, A., & Abdi, B. (2019). Students' landscaping preferences for open spaces for their campus environment. *Indoor and Built Environment, 28*(5), 668-686.

[5]. Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health, 35*, 207-228.

[6]. Jiang, B., & Sullivan, W. C. (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape and Urban Planning, 148*, 149-158.

[7]. Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.

[8]. Kuo, F. E., & Sullivan, W. C. (2001). Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behavior, 33*(3), 343-367.

[9]. Lau, S. S. Y., Gou, Z., & Liu, Y. (2014). Healthy campus by open space design: Approaches and guidelines. *Frontiers of Architectural Research, 3*(4), 452-467.

[10]. Lee, S., Russo, A., Jenkin, Z. M., & Vale, B. (2022). How university blue and green space affect students' mental health: A systematic review. *International Journal of Environmental Research and Public Health, 19*(5), 2883.

[11]. Leather, P., Pyrgas, M., Beale, D., & Lawrence, C. (1998). Windows in the workplace: Sunlight, view, and occupational stress. *Environment and Behavior, 30*(6), 739-762.

[12]. McFarland, A. L., Waliczek, T. M., & Zajicek, J. M. (2008). The relationship between student use of campus green spaces and perceptions of quality of life. *HortTechnology, 18*(2), 232-238.

[13]. Speake, J., Edmondson, S., & Nawaz, H. (2013). Everyday encounters with nature: Students' perceptions and use of university campus green spaces. *Human Geographies, 7*(1), 21-31.

[14]. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420-421.