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Psychological impact of space on students in educational institute

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Abstract

Effective spatial design in educational institutions goes beyond aesthetics; it is deeply tied to students' psychological experiences and academic success. This study investigates the psychological impact of spatial design on students at JD School of Design, Bengaluru, an institution situated in the bustling urban environment of MG Road, "Holistic design approach aligns with the idea that educational environments should foster not only cognitive growth but also emotional and social well-being, particularly in creative fields where spatial factors can stimulate innovation and reduce stress" Barrett *et al*. 2015. The research explores key spatial factors, including layout, natural light, collaborative zones, color schemes, and the unique influence of the school's urban location on students' creativity, focus, and stress levels.

Through this research, we hope to uncover how specific spatial elements-such as the open studio layout and natural lighting-may contribute to fostering creativity and comfort, creating an environment conducive to both collaborative learning and individual reflection. We also aim to examine how the intensity of the MG Road urban setting, with its associated noise and cityscape views, might affect students' concentration and stress levels. Our findings are expected to reveal a nuanced relationship between space and student psychology, suggesting that while the school's design supports the needs of creative learning, potential enhancements in noise control and designated quiet zones could further benefit student well-being.

This research contributes to the growing field of environmental psychology in educational settings, emphasizing the importance of spatial adaptability to foster psychological resilience, creativity, and academic engagement in design students. Future research could extend this approach to other urban-based design schools to explore broader implications.

Keywords: Spatial layout, educational environment, cognitive performance, adaptability, color theory

1. Introduction

The physical environment of educational institutions profoundly influences students' psychological well-being, creativity, and academic performance. In design-focused institutions like JD Institute of Fashion Technology, where innovation and creativity are central to learning, the design and functionality of campus spaces play an even more critical role. Elements such as classroom layouts, lighting, acoustics, and access to communal or private spaces shape how students think, interact, and experience their academic journeys. These spaces not only support academic engagement but also contribute to reducing stress and fostering a sense of belonging and collaboration. While existing research underscores the importance of well-designed learning environments in educational institutes, there is limited research on how they enhance cognitive performance and emotional health in the institutions. Students often require environments that inspire collaboration and innovative thinking while also offering spaces for quiet focus and individual reflection, this paper focuses on examining how the physical spaces at JD Institute of Fashion Technology, Bengaluru, impact students' mental well-being, academic focus, and creativity. By exploring key spatial elements, such as lighting, noise levels, communal areas, and quiet zones, the study highlights how these factors influence the overall student experience. The findings aim to provide a nuanced understanding of the relationship between space and

psychological outcomes in a creative educational context. Readers can expect insights into how specific design elements affect students' well-being and actionable recommendations to optimize campus environments for holistic growth.

2. Materials and Methods

2.1. Literature Review

2.1.1. Online Case Studies on two Educational Institutions namely The Vietnam Institute for Advanced Study in Mathematics [1] and the HPI School of Design Thinking [2].

These studies highlight the psychological impact of space on students in educational institutes, combining *Key Takeaways* from the case studies. These points reflect design strategies that enhance learning, well-being, and community in academic settings:

- **Flexible and Adaptable Spaces:** Both institutes emphasize flexible, reconfigurable spaces that cater to diverse learning styles and allow students to personalize their environment. This adaptability fosters a sense of control and autonomy, which enhances engagement and reduces stress.
- **Central Social Hubs:** A central "town square" or courtyard area serves as the main social gathering point in both institutes. These hubs encourage social interaction, collaboration, and community, which are vital for a positive learning atmosphere and for reducing feelings of isolation.
- **Quiet Reflection Zones:** Designated "me" or quiet spaces offer areas for individual work, reflection, and mental recharging. These spaces are especially beneficial in high-intensity academic settings, as they allow students to retreat from social interactions and noise, promoting focus and emotional regulation.
- **Natural Light and Views of Nature:** Abundant natural light and views of greenery are key elements in both projects, contributing to improved mood, mental clarity, and reduced anxiety. Exposure to nature in educational spaces has been shown to support cognitive performance and well-being.
- **Sustainability and Environmental Comfort:** Eco-friendly features like natural ventilation, energy-efficient lighting, and sustainable materials improve indoor air quality and create a comfortable thermal environment. This focus on sustainability not only aligns with modern values but also enhances student health, alertness, and satisfaction.
- **Transparency and Visibility:** Open and transparent spaces, where activities are visible, promote a collaborative and accountable atmosphere. Glass walls and open studios allow students to observe each other's work, which fosters a culture of shared learning and motivates continuous engagement.
- **Integration of Mathematical and Design Elements:** The incorporation of subject-specific symbols and motifs, such as mathematical symbols at VIASM, and exposed infrastructure at HPI, creates a visual connection to the disciplines students are studying. These subtle design cues help reinforce a sense of purpose and relevance, enhancing students' intellectual engagement with their field.
- **Furniture that Encourages Interaction:** Moveable furniture in both institutes supports dynamic learning setups, allowing students to quickly form groups or work individually. This ease of rearrangement supports spontaneous collaboration and interaction, which is psychologically beneficial for creativity and peer learning.
- **Community-Centric Layouts:** Layouts that separate spaces into distinct zones (such as "we" and "us" spaces) promote diverse social interactions and a sense of community. These layouts support different social dynamics-group work, casual encounters, or quiet study-allowing students to choose spaces that fit their psychological needs at any given time.
- **Collaborative Design Process:** Both institutes involved stakeholders in the design process, ensuring the space would meet the psychological and practical needs of students and faculty. This inclusive approach results in spaces that students feel were made specifically for them, fostering a sense of ownership and belonging.

Conclusion

These elements create environments that holistically support student well-being, collaboration, and cognitive function, making them effective models of psychologically supportive educational spaces.

2.1.2. Live case study on NIFT Bengaluru

The NIFT Bangalore campus, designed with a focus on both functionality and aesthetic appeal, demonstrates how architectural design can positively influence the psychological well-being of students in an educational environment.

- **Centralized Amphitheatre:** The open-air theatre acts as a hub for cultural and academic interaction, fostering a sense of community and encouraging creative expression through events and activities.
- **Radial Layout Design:** The campus is organized in a radial "snail" layout with the amphitheatre at its center, promoting easy navigation and reducing spatial confusion. This design enhances students' sense of direction and spatial comfort.
- **Light and Shadow Play:** Features such as pergolas and open corridors allow natural light to filter through, creating dynamic light and shadow patterns. Exposure to natural light enhances mood, reduces fatigue, and supports circadian rhythms, which are essential for mental health.
- **Landscaped Natural Spaces:** The integration of greenery, including a nearby lake and a central banyan tree, provides visual and physical access to natural elements. These spaces have been shown to reduce stress, improve focus, and foster relaxation.
- **Dedicated Social Zones:** Informal gathering spaces, such as those near the canteen or under the banyan tree, encourage casual interactions. Social connections are essential for reducing feelings of isolation and enhancing a sense of belonging in students.
- **Sheltered Walkways for Seamless Mobility:** Covered pathways link various academic blocks, ensuring students can move freely regardless of weather conditions. This convenience reduces stress associated

with disruptions and creates a consistent, calming environment.

- **Use of Warm, Local Materials:** The combination of materials like laterite stone, wood, and steel provides a tactile warmth and visual appeal. These materials connect students to the local cultural context, grounding them and enhancing a sense of identity and comfort.
- **Spaces for Creativity and Display:** Dedicated exhibition zones and galleries allow students to showcase their work. The act of displaying one's creativity fosters confidence, self-expression, and pride, which are crucial for emotional and intellectual growth.
- **Climate-Responsive Design:** The architecture responds to Bangalore's climate with features like shaded corridors and passive cooling systems. A comfortable temperature environment promotes better concentration and reduces physical discomfort that could otherwise distract students.
- **Integration of Collaborative and Private Spaces:** The campus balances open, collaborative areas with secluded zones for focused work. This balance ensures that students can shift between social interaction and individual reflection, supporting diverse psychological needs.

Conclusion

These design features demonstrate how the NIFT Bangalore campus prioritizes the psychological well-being of students by fostering creativity, reducing stress, and providing a harmonious balance between interaction and solitude. (*HPI School of Design Thinking*, 2024; "The Vietnam Institute for Advanced Study in Mathematics," 2022).

2.1.3 Online Case Studies on two Research Papers on "How Does the Interior Design of Learning Spaces Impact the Students` Health, Behavior, And Performance" [3] and "Psychological Effects of School Space on Students' Learning and Behavior [4].

These papers highlight the psychological impact of space on students in educational institutes, combining Key Takeaways from both the research papers. These points reflect design strategies that enhance learning, well-being, and community in academic settings:

- **Lighting and Mental Health:** Natural light is essential for students' mental clarity, mood, and energy levels. Exposure to natural lighting in classrooms has been shown to reduce stress, improve focus, and increase feelings of comfort, whereas inadequate lighting can lead to eye strain, fatigue, and decreased motivation.
- **Color's Psychological Impact:** The color schemes used in classrooms influence students' emotional states and cognitive performance. Cool colors like blue and green promote calmness, focus, and creativity, while warm colors like yellow and orange encourage social interaction and enthusiasm. In contrast, overly neutral or white spaces can feel sterile, leading to boredom and decreased engagement.
- **Classroom Size and Sense of Security:** The size of a classroom and the spatial arrangement of furniture impact students' sense of security and comfort. Smaller, well-arranged classrooms allow students to feel more at ease and form positive interpersonal connections, while overcrowded spaces can induce stress, aggression, and a sense of confinement.
- **Seating Flexibility and Autonomy:** Flexible seating arrangements that allow students to choose or adjust their seating can increase a sense of autonomy and comfort. This flexibility helps students feel psychologically secure, enhances engagement, and supports social interactions, which are crucial for a positive learning experience.
- **Thermal Comfort and Cognitive Function:** The temperature of a learning space affects mental focus and comfort. High temperatures can lead to irritability and distractions, while low temperatures may cause discomfort and hinder concentration. Maintaining an optimal temperature range is key to promoting a calm, focused mindset.
- **Ventilation and Psychological Refreshment:** Good air quality, primarily achieved through natural ventilation, positively impacts cognitive function and mood by reducing lethargy and increasing alertness. Poor ventilation, on the other hand, can lead to fatigue, irritability, and reduced mental clarity, which can disrupt learning.
- **Spatial Design and Social Interaction:** Noise levels play a significant role in students' ability to focus and feel calm. Excessive noise can lead to stress, reduced attention span, and irritability. By incorporating sound-absorbing materials and reducing external noise, educational spaces can create a more peaceful environment, reducing anxiety and promoting mental well-being.
- **Psychological Effects of Aesthetics and Sensory Comfort:** Noise levels play a significant role in students' ability to focus and feel calm. Excessive noise can lead to stress, reduced attention span, and irritability. By incorporating sound-absorbing materials and reducing external noise, educational spaces can create a more peaceful environment, reducing anxiety and promoting mental well-being.
- **Space Design and Emotional Security:** Providing adequate personal space in the classroom helps students feel emotionally secure, which is vital for a supportive learning environment. Environments that lack sufficient personal space may lead to heightened anxiety, discomfort, and a reduced sense of personal control, affecting focus and engagement.

Conclusions

These points collectively underscore the importance of creating thoughtfully designed educational spaces that prioritize students' psychological well-being, fostering environments conducive to mental health, social connections, and effective learning.

2.1.4 Architect who focused on this topic while designing a project [5].

Balkrishna Vithaldas Doshi, the Pritzker Prize-winning Indian architect, designed several educational institutes with a deep understanding of the psychological impact of space on learning and well-being. One of his most celebrated examples is the *Centre for Environmental Planning and*

Technology (CEPT) University in *Ahmedabad*, India. This institute showcases Doshi's philosophy of designing spaces that foster creativity, openness, and a strong connection with nature.

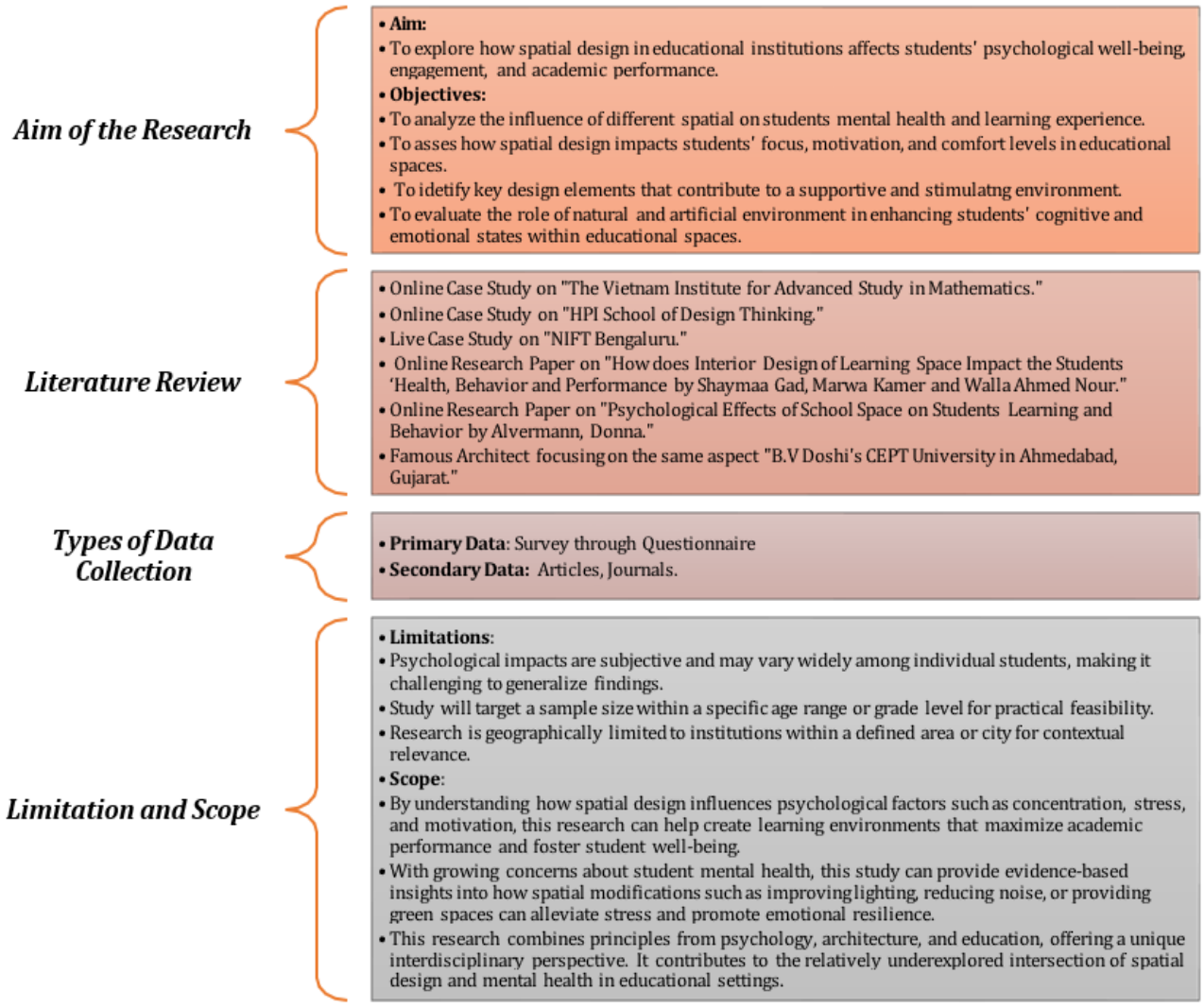
Key Features of CEPT University Reflecting B.V DOSHI'S Psychological and Spatial Approach

- **Open and Interconnected Spaces:** He designed CEPT University with open courtyards, terraces, and interconnected spaces that encourage free movement and interactions among students and faculty. This approach nurtures a sense of community and collaboration, breaking down hierarchical barriers that often exist in traditional educational settings.
- **Natural Light and Ventilation:** His use of natural light, shade, and ventilation minimizes the boundary between indoor and outdoor spaces, reducing the feeling of confinement and promoting a comfortable learning environment. This aspect is crucial in warm climates, as it helps maintain a pleasant temperature while enhancing students' and teachers' connection to nature.
- **Flexible Learning Spaces:** CEPT was designed with flexible spaces that could be adapted for different functions, whether for quiet study, group work, or workshops. Doshi understood that learning environments need to be versatile to accommodate various teaching methods and learning preferences, fostering psychological comfort and focus.
- **Integration with the Environment:** The buildings are situated amidst greenery, with vegetation that grows into the architecture, encouraging students to view the campus as a natural extension of the environment. This biophilic design approach is known to improve mental health, reduce stress, and foster a greater sense of peace and relaxation.
- **Human-Scaled Architecture:** His designs at CEPT use human scale as a core principle, making the spaces feel intimate rather than overwhelming. By considering the psychological impact of scale, he created a campus that feels welcoming and approachable, helping students feel at ease and more connected to their surroundings.

Conclusion

Through CEPT University, Doshi demonstrated how thoughtful architectural design could enhance the educational experience, nurturing creativity and well-being by prioritizing the psychological impact of space on its occupants. His work exemplifies how architecture can inspire and shape the minds of future generations.

2.2. Methodology



3. Results and Discussion

3.1. Graphical Representation of the survey

Which program are you enrolled in?

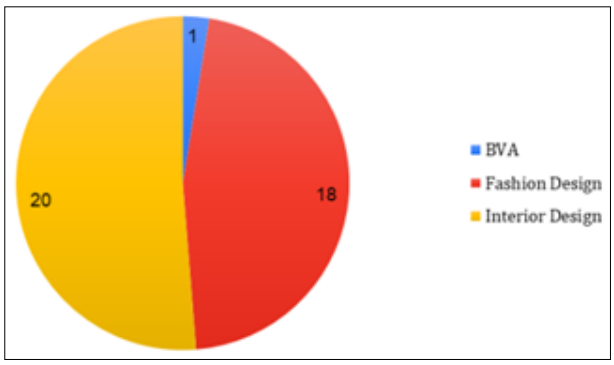


Fig 1: Total Number of Students in Each Program

The above graph illustrates how many students participated in the survey and the field that they belong too. Majority of the students are from the interior design background and the least from BVA.

To what extent do you feel that the physical environment of the campus (lighting, layout, color schemes) supports your academic and creative activities (1 being least supportive and 5 being most supportive)?

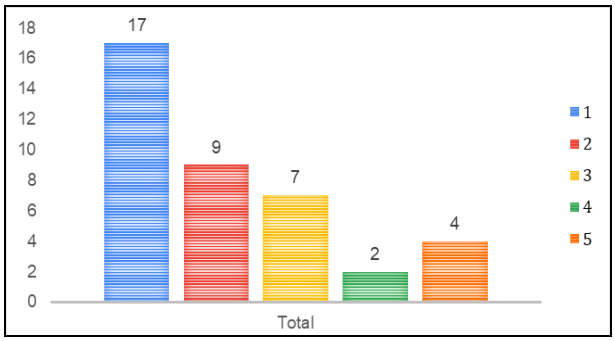


Fig 2: Rating on physical environment being supportive or not

As seen in the above graph, most of the students are not happy with the physical environment of the campus, 17 students do not find it supportive at all, 9 find it somewhat supportive, 7 are neutral on their opinion, 2 find it supportive and 1 student finds it very supportive.

How helpful are the classrooms/studio spaces to your learning and creativity (1 being least helpful and 5 being most helpful)?

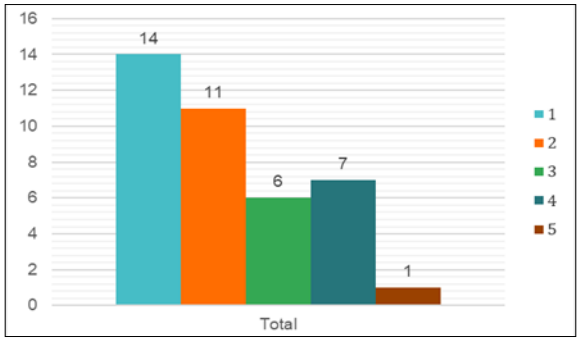


Fig 3: Rating on the classrooms/studio spaces being helpful in learning and creativity

As seen in the above graph, most of the students do not find the classroom/studio space helpful for their learning and creativity, 14 students do not find it helpful at all, 11 find it somewhat helpful, 6 are neutral on their opinion, 7 find it helpful and 1 student finds it very helpful.

Do you feel that the classroom/studio design promotes collaboration and interaction with peers?

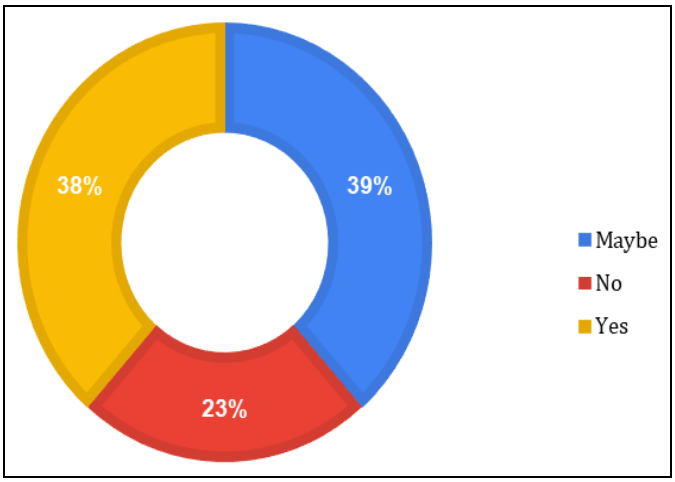


Fig 4: Does the classrooms/studio space promote collaboration and interaction

As seen in the chart, 39% of the student aren't sure about it, 38% of the students agree to the fact and 23% of the students do not agree to it. When asked why do they feel so, most of the students replied by informing that because the tables are in a linear setup its really difficult to interact with everyone and that they end up interacting with just 5-6 students.

Is the layout of the classroom/studio space flexible enough to accommodate different types of activities (group work, individual work, hands-on projects)?

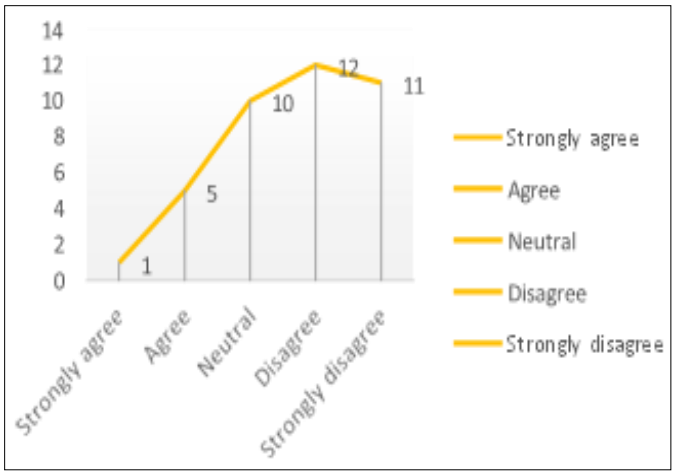


Fig 5: Is the layout of classrooms/studio space flexible enough to accommodate different activities.

As seen in the graph above most of the students do not agree to the classrooms/studio space being flexible enough for them to perform different activities.

How sufficient are the quiet study areas for individual work and concentration (1 being least sufficient and 5 being most sufficient)?

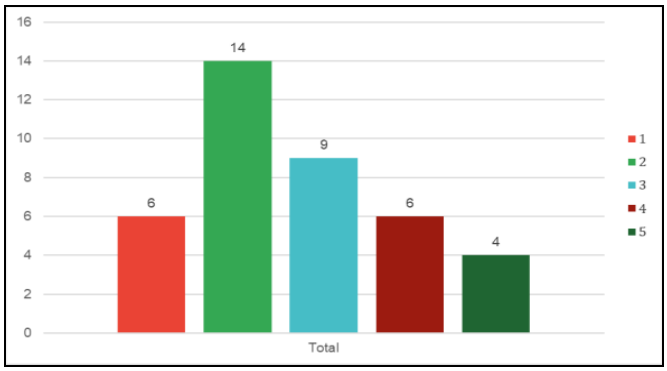


Fig 6: Rating on the sufficiency of the quiet study areas for individual work and concentration

As seen in the graph above, students do not find the quiet areas sufficient or helpful enough for individual work or concentration.

Do you feel that the availability of quiet, private spaces would help reduce your stress and increase focus?.

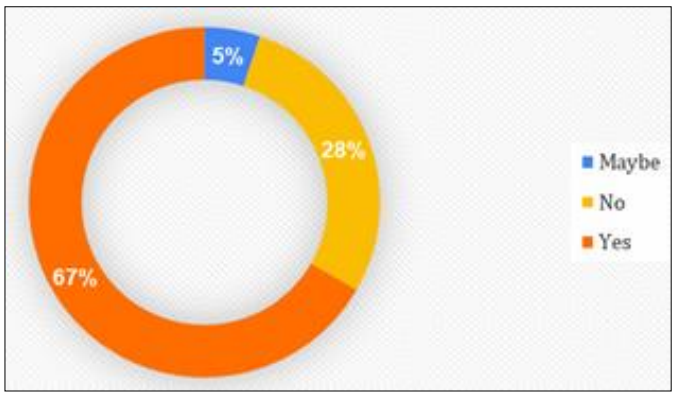


Fig 7: Availability of quiet, private spaces for reducing stress and increasing focus

As seen in the chart above majority i.e., 67% of the students feel that incorporating quiet/private spaces will help them reduce stress and increase their focus.

How important is access to natural light for your well-being and concentration (1 being least imp. and 5 being most imp.)?

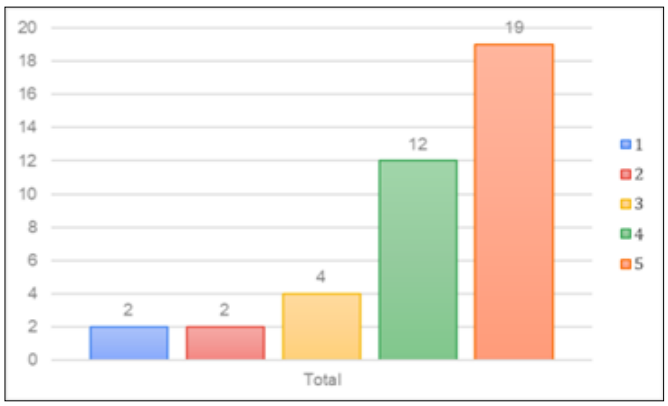


Fig 8: Importance of access to natural light for well-being and concentration

As seen in the graph above majority of the students either agree or strongly agree to the fact that access to natural light is very important for one's well-being and concentration.

Does the campus have enough green or outdoor spaces that contribute to your relaxation and mental clarity?

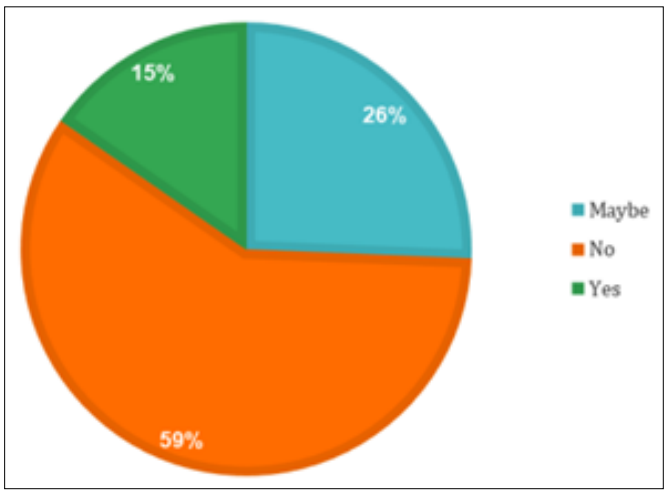


Fig 9: Green/outdoor space availability for relaxation and mental clarity

As seen in the chart above, most of the students i.e., 59% of them do not feel that the campus has enough green or outdoor spaces that can help them wind down, relax or have some clarity.

Overall, how would you rate the impact of the physical campus environment on your academic performance and creativity (1 being very negative and 5 being very positive)?

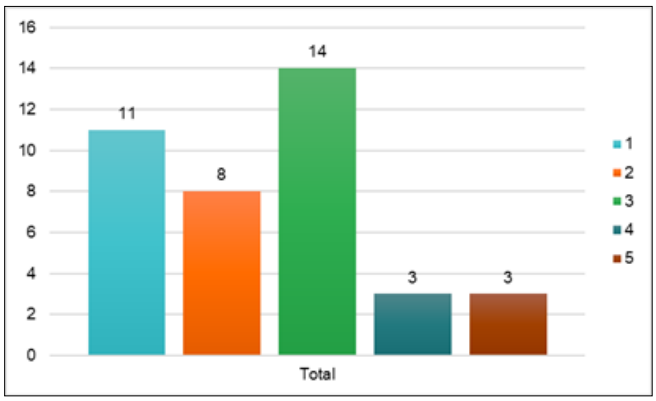


Fig 10: Overall rating of the campus impact on students

As seen in the graph above again most of the students either feel that the campus has a negative impact on their performance or creativity or are neutral towards this fact.

What suggestions or improvements would you propose for the common and social spaces at JD Institute to better support your academic, creative, and social needs, and are there any additional spaces or features you wish were available to enhance your overall experience?.

- **Common and Social Spaces:** There is a significant need for improved communal areas, such as a fully-equipped cafeteria, cozy seating, study spaces, recreational zones, and places intended to encourage collaboration. The importance of incorporating private research laboratories, creative studios, and outdoor relaxation areas is also highlighted.
- **Changes for Academic and Creative Needs:**

Suggestions include enhancing seating and workspace ergonomics, ensuring sufficient electrical outlets, improving ventilation, and increasing access to natural light. Additional recommendations involve reconfiguring classroom layouts for adaptability, establishing designated quiet zones, integrating technology, creating resource libraries, and developing wellness spaces to boost concentration and creativity.

- **Additional Features:** Many respondents wish for a larger library, better bathroom facilities, an auditorium for exhibitions and events, and a campus with a cohesive design that encourages collaboration and creativity.

3.2. Results

1. Satisfaction with Campus Design and Support for Academic Activities

Key Findings

- Satisfaction scores for the overall design and layout were low to moderate, with some areas showing room for improvement.
- The physical environment (lighting, layout, and color schemes) was acknowledged for its potential to support academic and creative activities, though some respondents rated this aspect poorly.
- Implication: While the design meets basic expectations, enhancing aesthetics and functionality to better align with students' academic and creative needs is essential. Prioritizing aspects such as improved lighting and thoughtfully planned layouts can boost satisfaction and performance.

2. Classroom and Studio Spaces: Collaboration and Flexibility

Key Findings

- Classrooms and studios were generally considered helpful for learning and creativity, though the design's ability to promote collaboration and interaction with peers received mixed responses.
- Opinions on the flexibility of these spaces varied, with some students expressing a need for adaptable layouts to accommodate diverse activities (e.g., group work, individual tasks, hands-on projects).
- Implication: Reconfiguring spaces to include modular furniture and flexible layout.

3. Quiet Zones and Mental Well-Being

Key Findings

- Quiet spaces for individual work and concentration were considered insufficient by many students, with an emphasis on their negative impact on stress reduction and focus.
- The campus environment contributed moderately to mental well-being for most students, though occasional stress-inducing factors, such as crowded or poorly designed areas, were noted.
- Implication: Expanding quiet zones, minimizing distractions, and adopting calming design elements like soothing color schemes and ergonomic layouts can further support mental well-being.

4. Importance of Natural and Outdoor Elements

Key Findings

- Natural light was unanimously considered important for well-being and concentration.
- Opinions on outdoor and green spaces were mixed; while some students valued these areas, others felt their availability was limited.
- Implication: Maximizing exposure to natural light through large windows or skylights and increasing outdoor spaces with greenery can enhance relaxation, mental clarity, and overall satisfaction with the campus environment.

5. Overall Impact on Academic and Creative Performance

Key Findings

- The campus environment's overall impact on academic performance and creativity was rated low to moderately by most students.
- Stress from inadequate design elements occasionally hindered productivity, highlighting the need for thoughtful spatial planning.
- Implication: A comprehensive redesign that blends functionality, aesthetics, and adaptability can significantly enhance academic outcomes and foster creativity.

6. Suggestions for Improvement and Desired Additions

Key Findings

- Students suggested various improvements, such as:
- Cafeterias and food areas.
- Private research labs and creative studios.
- Comfortable seating and enhanced collaborative spaces.
- Expanded socket provisions and tech-friendly spaces.
- Implication: Addressing these suggestions can create an environment set for modern academic and creative demands. Collaborative zones, social spaces, and private study areas should be designed to meet diverse preferences and needs.

3.3. Discussion

This study underscores the intricate relationship between campus design and students' psychological well-being, creativity, and academic performance. Key findings reveal both strengths and areas requiring improvement, with implications for the design of holistic educational environments.

1. **Design Limitations and Academic Support:** While the current campus design provides baseline functionality, dissatisfaction with spatial elements like lighting, layout, and color schemes reflects its limited ability to fully support academic and creative endeavours. This aligns with Barrett *et al*. (2015), who emphasize that well-designed environments can directly enhance cognitive performance. Targeted improvements in aesthetics and ergonomic layouts are critical for aligning spaces with students' needs.
2. **Collaborative and Flexible Spaces:** Linear setups in classrooms hinder interaction and flexibility, restricting dynamic learning experiences. Modular designs, as

highlighted in case studies from Vietnam Institute for Advanced Study in Mathematics and HPI School of Design Thinking, demonstrate how reconfigurable spaces foster innovation and community. Adopting such strategies could enable JD students to transition seamlessly between collaborative and individual tasks.

3. **Role of Natural Light and Outdoor Spaces:** Natural light was unanimously valued, yet limited access to outdoor spaces restricted its potential benefits. Biophilic design, as evident in CEPT University's architecture, demonstrates that integrating nature into campus environments promotes mental clarity and reduces stress. Expanding green spaces and optimizing light access are essential steps forward.
4. **Comprehensive Impact on Creativity and Performance:** The overall campus design has a mixed impact on academic and creative outcomes, with recurring stress linked to inadequate spatial planning. As Doshi's principles at CEPT University show, cohesive, human-scaled designs can transform learning spaces into environments that nurture intellectual and emotional growth.

This discussion highlights the need for a balanced approach to campus design-one that integrates functionality, adaptability, and psychological comfort. Addressing these factors can foster an enriched, inspiring, and inclusive learning atmosphere.

4. Conclusion

This study highlights the vital role of spatial design in shaping students' psychological well-being, academic performance, and creativity. While the existing campus design meets basic functional needs, gaps in flexibility, collaborative spaces, quiet zones, and natural elements limit its effectiveness. Addressing these shortcomings through adaptable layouts, restorative zones, and biophilic design can significantly enhance student outcomes.

By addressing these gaps, institutions can create learning environments that not only enhance academic and creative outcomes but also contribute to students' emotional resilience and well-being. This research provides actionable insights for the JD School of Design and similar institutions to evolve their spaces into models of inclusive and adaptive educational design.

Future studies could expand this research to diverse urban campuses, exploring broader correlations between spatial design and psychological outcomes, ultimately enriching the discourse in environmental psychology and educational design

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