

Open And Informal Spaces: Enhancing Learning in Residential School Campuses

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Abstract— Residential school campuses are not only places for formal classroom learning but also environments where students live, interact, and learn through daily experiences. Enhancing Open and informal spaces such as courtyards, gardens, corridors, sit-out areas, and playgrounds play a significant role in the learning experience of students. These spaces encourage interaction, creativity, relaxation, and collaborative learning among students.

This research aims to study how open and informal spaces contribute to enhancing the learning experience in residential school campuses. The study explores various spatial elements, design strategies, and planning approaches that help create effective informal learning environments. The key findings suggest that how spaces extend learning beyond classrooms, how open spaces improve students' mental and physical well-being, how spaces support creativity and independent learning, how spaces encourage social interaction and collaboration.

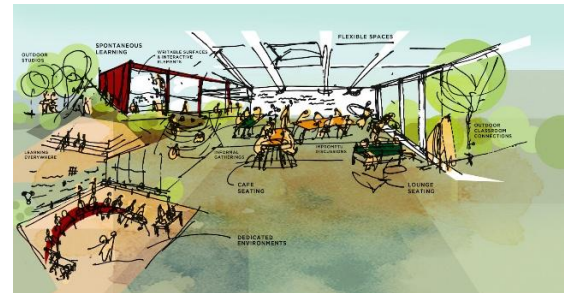
Index Terms— Open learning spaces, informal learning environments, residential school campuses, educational architecture, campus planning, and learning environments.

I. INTRODUCTION

With the growing time, the way we learn is changing. Learning is no longer limited to traditional classrooms but extends to various spaces within the educational campus that encourage interaction, creativity, and experiential learning. The role of the physical surroundings becomes even more important in shaping their learning experiences.

Open and informal spaces such as courtyards, gardens, corridors, sit-out areas, and playgrounds provide opportunities for students to engage in discussions, collaborative learning, and recreational activities beyond formal classroom settings. These spaces create a comfortable and flexible environment where students can interact freely, share ideas, and develop social and communication skills. It not only helps in academic development but also supports the

social, emotional, and physical well-being of students.



These spaces also allow students to connect with nature, which helps in improving their mental well-being, creativity, and concentration.

From an architectural perspective, the design and planning of these spaces influence how effectively they are used by students. Therefore, integrating these spaces in residential school campuses helps create a balanced environment that encourages academic growth as well as social and personal development.



Need

Students living in residential schools stay away from their homes and families for a long period of time, which makes the school campus their primary living and learning environment. In such situations, the campus should not only function as an educational institution but also as a place that provides comfort, safety, and a sense of belonging similar to a home. Open and informal learning spaces plays an important role in creating this homely and supportive atmosphere.

Scope

1. To study different types of open and informal learning spaces within residential school campuses such as courtyards, corridors, gardens, sit-out areas, and common gathering spaces.
2. To understand how these spaces contribute to students' learning, interaction, and overall development beyond the classroom.
3. To analyze the architectural planning and spatial organization of open and informal spaces in residential school campuses.

Objective

1. To make a comfortable place and creating emotional comfort similar to a home environment.
2. emotional comfort similar to a home environment.
3. Analyze how these spaces support informal learning, creativity, and personal development beyond the classroom.
4. To identify architectural design elements that can help create student-friendly spaces that support both living and learning in residential school campuses.

II. LITERATURE REVIEW

A. Evolution of Informal space

The concept of informal learning spaces originates from progressive educational philosophies that emphasize learning through experience, interaction, and environment rather than only classroom instruction. In the early 20th century, educational thinkers such as John Dewey introduced the idea that learning occurs through social interaction, exploration, and real-life experiences. This philosophy influenced architects to design schools where learning could happen beyond the classroom. Later, architectural movements such as open-plan schools in the 1960s further developed this concept by removing rigid classroom boundaries and creating flexible, shared spaces for collaborative learning. From an architectural perspective, the concept evolved into designing courtyards, corridors, learning commons, and outdoor areas as extensions of classrooms, allowing educational campuses to function as dynamic environments where students learn through both formal and informal interactions.

B. Case studies of Residential School

Live case studies

1. Anubhuti residential school, Jalgaon, India. (School A)

Literature Case studies

1. The British School, New Delhi, India (School B)
2. Weilong School, Shenzhen, China (School C)

C. Challenges in existing Designs

Existing residential school designs face several challenges from an architectural point of view. Many campuses are planned mainly with classrooms, hostels, and administrative blocks, while informal learning spaces like courtyards, shaded seating areas, or interactive corridors are limited or poorly designed. As a result, students often lack comfortable places for discussion, group study, or relaxation outside the classroom. Another issue is the poor connection between academic and residential areas, which reduces continuous interaction and learning throughout the day. In some schools, open spaces are used only as playgrounds instead of being designed as learning landscapes. According to guidelines of organizations such as Central Board of Secondary Education and National Council of Educational Research and Training, school campuses should provide safe, healthy, and child-friendly environments with adequate open spaces, ventilation, natural light, and activity areas. However, many existing designs do not fully utilize these spaces for learning purposes.

D. Regulatory and Design Guidelines

Residential school campuses in India should follow several planning standards, building codes, and educational regulations to ensure safety, comfort, and proper learning environments. Guidelines are provided by organizations such as the Central Board of Secondary Education and the National Council of Educational Research and Training for school infrastructure and campus planning. From a regulatory perspective, school buildings must comply with the Bureau of Indian Standards codes such as IS 8827:1978 (Recommendations for Basic Requirements of School Buildings), which provides standards for classroom size, lighting, ventilation, and circulation spaces. Safety and fire protection requirements are governed by the NBC of India, which includes regulations for exits, staircases, fire safety systems, and occupancy limits in educational buildings. In addition, basic educational infrastructure requirements are influenced by the Right of Children to Free and Compulsory Education Act, 2009, which emphasizes adequate classrooms,

sanitation, drinking water, playgrounds, and safe learning environments.

III. METHODOLOGY

3.1 Research Approach

This research adopts a mixed-method approach, combining both qualitative and quantitative methods to understand the role of open and informal learning spaces in residential school campuses. The qualitative aspect focuses on understanding how architectural spaces influence student interaction, comfort, and learning experiences. This includes discussions and interviews with architects, school administrators, and teachers to gather insights into spatial design and campus planning. The quantitative approach involves surveys and questionnaires conducted with students and users of residential school campuses to analyze how frequently informal spaces are used and how they contribute to learning activities outside classrooms. By integrating both methods, the study provides a balanced understanding of user experiences as well as measurable spatial characteristics of the campus environment.

3.2 Data Sources

To develop a comprehensive analysis, the research uses multiple sources of information:

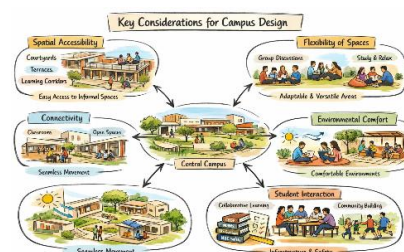
1. **Surveys:** Questionnaires are conducted among students and teachers of residential schools to understand how informal spaces such as courtyards, corridors, gardens, and common areas are used for study, discussion, and social interaction.
2. **Interviews:** Semi-structured interviews with architects, planners, and school management help identify design strategies, challenges, and planning considerations involved in designing residential school campuses.
3. **Architectural Case Studies:** Selected residential school campuses are analyzed to evaluate how open and informal learning spaces are integrated within the academic and residential environments. The case studies focus on spatial

organization, circulation, landscape integration, and student interaction areas.

3.3 Design Analysis framework

To evaluate the effectiveness of open and informal learning spaces, a structured architectural analysis framework is used. The framework considers the following parameters:

1. **Spatial Accessibility:** Availability and ease of access to informal spaces such as courtyards, terraces, and learning corridors within the campus.
2. **Flexibility of Spaces:** Ability of spaces to accommodate different activities such as group discussions, independent study, relaxation, and social interaction.
3. **Connectivity:** The relationship between classrooms, hostels, and open spaces, ensuring that informal learning areas are easily reachable from different parts of the campus.
4. **Environmental Comfort:** Natural lighting, ventilation, shading, and landscape elements that make open spaces comfortable for students to use.
5. **Student Interaction:** Opportunities created by the design for social engagement, collaborative learning, and community building among students.
6. **Compliance with Planning Standards:** Evaluation of campus planning according to educational infrastructure guidelines and building standards such as recommendations by the Central Board of Secondary Education, Bureau of Indian Standards, and safety provisions outlined in the National Building Code of India.



Data Table

criteria	School A	School B	School C	Average rating (1-5)	Explanation

Accessibility	4.6	3.4	2.9	3.6	School A provides barrier-free circulation with ramps, shaded pathways. School C has limited accessibility
Spatial flexibility	4.3	3.2	2.7	3.4	School A includes adaptable courtyards, amphitheater, and multipurpose outdoor spaces. School C has rigid layouts
Connectivity	4.5	3.3	2.8	3.5	In School A, informal spaces are well connected to classrooms, hostels, and libraries. In School C, open spaces are scattered and poorly integrated with academic zones.
Student interaction	4.7	3.5	3.0	3.7	School A encourages interaction through seating clusters, terraces, and shaded gathering spaces, while School C provides very few social learning areas.
Environmental comfort	4.6	3.7	3.1	3.8	School A uses landscape design, shading devices, and natural ventilation to create comfortable outdoor environments. School C has limited landscaping and shaded areas.
Community and cultural spaces	4.2	3.4	3.0	3.5	School A integrates amphitheaters and gathering spaces for events and community activities, whereas School C lacks such interactive spaces.

IV. EXPLANATION OF DATA

1. Accessibility

1. School A : Achieves the highest score because informal spaces such as courtyards, gardens, and pathways are designed with barrier-free access, ramps, and clear circulation networks.
2. School B : Provides moderate accessibility but lacks some inclusive features like continuous shaded walkways and universal access to terraces.
3. School C : Shows several limitations, including uneven pathways and restricted access to certain outdoor spaces.

2. Spatial Flexibility

1. School A: Informal spaces are designed as flexible areas that can accommodate group discussions, outdoor classes, and recreational activities.
2. School B and C: These campuses have limited flexibility since most open spaces are planned mainly for sports or circulation.

3. Connectivity

1. School A: Demonstrates strong spatial integration between classrooms, hostels, libraries, and open learning areas, allowing continuous movement and interaction.
2. School C: Informal spaces are isolated from academic blocks, reducing their usage for learning activities.

4. Student Interaction

1. School A: The campus provides multiple social spaces such as seating terraces, shaded courtyards, and learning steps that encourage peer interaction.
2. School B and C: Interaction mainly occurs in classrooms and dormitories due to a lack of well-designed informal spaces.

5. Environmental Comfort

1. School A: Uses climate-responsive design strategies such as trees, shaded pavilions, and natural ventilation to create comfortable outdoor environments.

2. School C: Limited landscaping and poor shading reduce the usability of outdoor spaces.

6. Community and Cultural Spaces

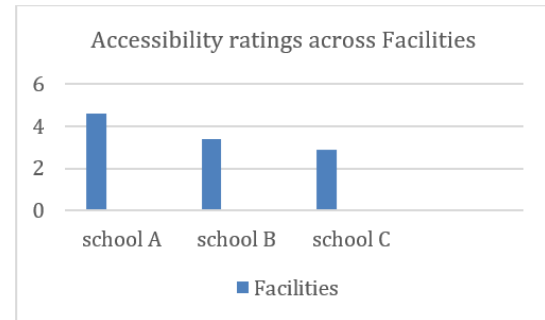
1. School A: Includes amphitheaters, gathering plazas, and multipurpose courtyards that support cultural activities and community engagement.
2. School C: Provides minimal gathering spaces, resulting in fewer opportunities for group learning and events.

Use of Data in Research Paper

- Comparison: The data table allows comparison between international, national, and local residential school campuses in terms of the quality and effectiveness of informal learning spaces.
- Benchmarking: School A (international campus) acts as a benchmark for best practices in designing open and informal learning environments.
- Identification of Gaps: Schools B and C highlight common issues in local residential school designs, such as poor connectivity, lack of flexible spaces, and underdeveloped outdoor environments.
- Recommendations: The analysis helps in proposing design improvements for better integration of informal spaces, enhanced student interaction, and improved environmental comfort.

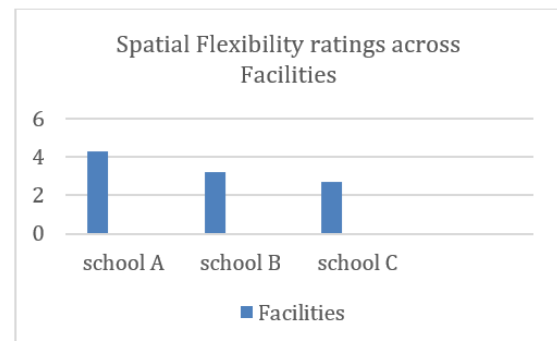
1. Accessibility

1. School A (4.6):
Rated highest due to well-planned, barrier-free movement across the campus. Informal spaces such as courtyards, gardens, and pathways are easily accessible, with proper circulation, gentle slopes, and shaded walkways.
2. School B (3.4):
Moderately accessible, with basic pathways and connections, but lacks continuous accessibility to all informal learning areas.
3. School C (2.9):
Shows poor accessibility, with uneven pathways and limited access to open and semi-open spaces, restricting student use.



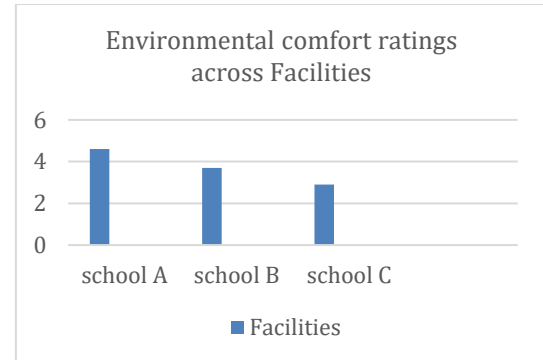
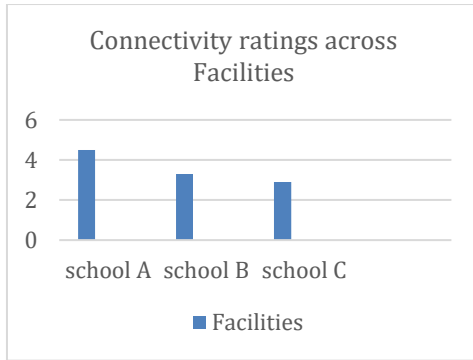
2. Spatial Flexibility

1. School A (4.3):
Provides highly flexible informal spaces such as multipurpose courtyards, amphitheaters, and terraces that support group study, events, and recreational activities.
2. School B (3.2):
Offers some flexibility, but most spaces are designed for specific uses and lack adaptability.
3. School C (2.7):
Has rigid spatial planning, where open areas are mainly limited to playgrounds and do not support diverse learning activities.



3. Connectivity

1. School A (4.5):
Strong integration between academic, residential, and open spaces, allowing smooth movement and continuous interaction across the campus.
2. School B (3.3):
Moderate connectivity, but some informal spaces are not directly linked to key activity areas.
3. School C (2.8):
Poor connectivity, with scattered open spaces that are not effectively integrated into daily student movement.



4. Student Interaction

1. School A (4.7):

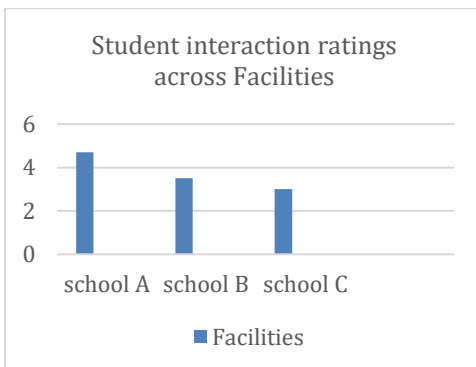
Encourages high levels of interaction through seating clusters, shaded gathering spaces, and learning steps integrated into the campus design.

2. School B (3.5):

Provides limited interaction spaces, with fewer dedicated informal learning zones.

3. School C (3.0):

Interaction is mostly restricted to classrooms and hostels due to lack of designed social spaces.



6. Community and Cultural Spaces

• School A (4.2):

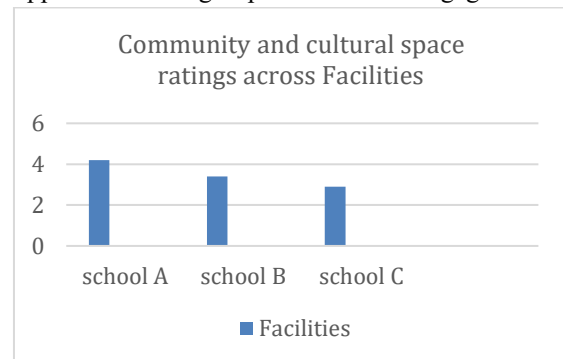
Includes amphitheaters, plazas, and gathering spaces that support cultural activities, events, and community interaction.

• School B (3.4):

Provides some common spaces but lacks strong integration of cultural and social functions.

• School C (3.0):

Minimal provision of community spaces, limiting opportunities for group activities and engagement.



5. Environmental Comfort

• School A (4.6):

Achieves high comfort through climate-responsive design, including shaded courtyards, trees, natural ventilation, and proper orientation.

• School B (3.7):

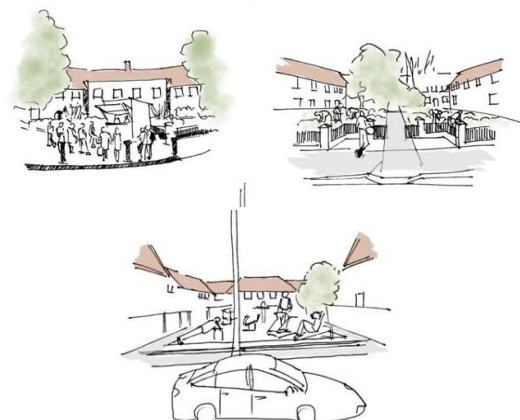
Moderately comfortable, with some shaded areas but lacking strong landscape integration.

• School C (3.1):

Low comfort levels due to insufficient shading, poor ventilation, and minimal landscape design.

5.1 Accessibility of Informal Spaces

Informal learning spaces should be easily accessible from all parts of the campus. Proper pathways, gentle slopes, and clear circulation help students move comfortably between academic and residential areas. Good connectivity and visibility encourage regular use of these spaces.



5.2 Flexible and Multi-Functional Spaces

These spaces should support different activities like group discussions, self-study, and relaxation. Courtyards, terraces, and amphitheaters can be designed as flexible areas that adapt to various student needs throughout the day.



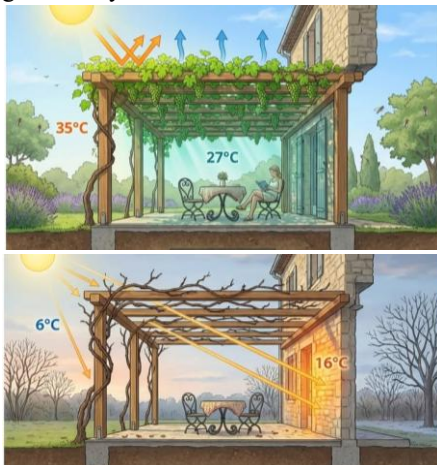
5.3 Student-Centered Amenities

Providing comfortable seating, shaded areas, and basic facilities like water and nearby washrooms improves usability. Such amenities create a relaxed and supportive environment where students can spend more time learning informally.



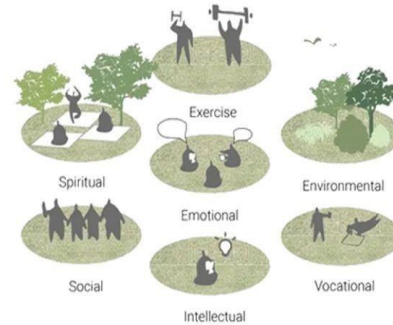
5.4 Climate-Responsive Design

Use of trees, shading devices, and natural ventilation makes outdoor spaces comfortable in different weather conditions. Climate-responsive design ensures that informal spaces remain usable throughout the year.



5.5 Social and Community Integration

Spaces like plazas and amphitheaters encourage interaction, group activities, and cultural events. These areas help build a sense of community and improve social learning among students.



V. COMPARATIVE ANALYSIS

5.1 Analysis of Current Designs

The quality of informal learning spaces in residential schools varies widely. International campuses generally provide well-designed courtyards, interactive corridors, and landscaped areas that support continuous learning and student interaction. These spaces are well integrated with academic and residential zones. However, many local residential schools lack such planning, with open spaces often limited to playgrounds and unused areas. Common issues include poor connectivity, lack of seating, and minimal use of outdoor spaces for learning.

5.2 Global Best Practices

Globally, residential school campuses focus on creating flexible and student-centered environments. Informal spaces such as learning commons, amphitheaters, and garden classrooms are designed to encourage collaboration and social interaction. These campuses integrate open spaces with buildings, ensuring easy accessibility and comfort. Climate-responsive design, landscape integration, and flexible use of spaces are key features that enhance the overall learning experience.

5.3 Identifying Gaps and Opportunities

Despite improvements, many residential schools still lack properly designed informal learning spaces. Key gaps include poor integration of open spaces, limited flexibility, and lack of student-centered design. Opportunities for improvement include better planning of courtyards and corridors, inclusion of shaded seating and landscape elements, and stronger connection between academic and

residential zones. Focusing on these aspects can help create more interactive, comfortable, and effective learning environments.

VI. DISCUSSION

6.1 Benefits of Informal Learning Spaces

Well-designed informal learning spaces in residential school campuses provide important social, academic, and psychological benefits. Socially, they encourage interaction, collaboration, and a sense of community among students living away from home. Academically, these spaces support self-learning, group discussions, and experiential learning beyond classrooms. Psychologically, access to open, green, and comfortable spaces helps reduce stress, improve well-being, and create a more positive learning environment. Such environments contribute to the holistic development of students, making the campus more engaging and supportive.

6.2 Challenges and Limitations

Despite their advantages, many residential schools face challenges in implementing effective informal learning spaces. Common issues include limited funding, lack of awareness, and traditional planning approaches that prioritize classrooms over open spaces. In existing campuses, retrofitting informal spaces can be difficult due to rigid layouts. Additionally, lack of climate-responsive design and poor maintenance reduce the usability of these spaces. In some cases, designers and authorities may not fully recognize the importance of informal learning, leading to underutilized or poorly planned areas.

VII. CONCLUSION

This study highlights the importance of integrating open and informal learning spaces in residential school campuses to enhance student learning and well-being. The comparison between different campuses shows that well-designed informal spaces improve interaction, flexibility, and overall campus experience. Incorporating design strategies such as better connectivity, flexible spaces, and climate-responsive planning can significantly improve the quality of learning environments. Informal learning spaces are not just additional features but essential components of modern educational design. By focusing on student-centered and interactive

environments, architects can create campuses that support both academic growth and personal development.

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