

DESIGN FOR ENHANCING THE FUNCTIONAL VALUE OF SCHOOL SPACES

THIẾT KẾ NÂNG CAO GIÁ TRỊ SỬ DỤNG CHO CÁC KHÔNG GIAN TRƯỜNG HỌC



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Abstract: Driven by the nationwide wave of digital transformation and pedagogical innovation, modern schools have transcended their traditional role as mere centers for knowledge transmission to become a critical determinant of educational effectiveness. By analyzing current interior conditions and applying a theoretical framework of functional utility and empirical evidence, this study proposes design solutions aimed at enhancing the use value of educational environments.

Keywords: educational technology integration, intentional visual design, multi-functional learning spaces, school interior design, school spaces.

Tóm tắt: Dưới tác động của làn sóng chuyển đổi số và đổi mới phương pháp giảng dạy trên toàn quốc, trường học ngày nay không chỉ là nơi truyền thụ tri thức đơn thuần, mà còn là yếu tố tác động to lớn đến hiệu quả giáo dục. Bằng việc phân tích thực trạng không gian nội thất trong thực tế, vận dụng nền tảng lý luận và thực nghiệm về công năng sử dụng, nghiên cứu này đưa ra các giải pháp thiết kế nhằm nâng cao giá trị sử dụng cho không gian trường học.

Từ khóa: không gian trường học, thiết kế thị giác có chủ đích, tích hợp công nghệ, tổ chức không gian đa chức năng.

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1. INTRODUCTION

On August 22, 2025, Resolution No. 71-NQ/TW regarding breakthrough developments in education and training was issued, emphasizing the goal: “*Strongly transition toward modern*

and active educational methods, enhance self-study and creative experiences, and guide students to develop independent thinking and problem-solving abilities”. In this context, school spaces must provide maximum support for flexible learning activities and multi-dimensional interactions. This creates an urgent requirement to restructure the organization and utilization of spaces within schools to optimize their ability to meet the needs of modern learning activities.

To realize this goal, the design of school interiors is considered a potential solution due to its direct impact. However, this solution has not been widely applied due to the specific requirements of the pedagogical environment, which serves a diverse group of users (teachers and students). Therefore, the key question is: “*How can we enhance the value of space usage without deviating from the standards of a training and teaching environment?*”

2. RESEARCH METHODOLOGY

This study employs two main research methods: Literature Review and Case Study. This dual approach allows for the establishment of a systematic theoretical framework while verifying feasibility through practical implementation.

2.1. Literature Review Method

The literature review is utilized to assess the current status of existing school spaces in Vietnam, identifying interior elements that require improvement and forming a set of evaluation criteria for the case study.

The research utilizes secondary data selectively gathered from scientific papers, international journals, industry reports, and policy documents (e.g., reports on digital transformation in

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education). This study inherits results from previous analyses of learning environments while adjusting for the Vietnamese context regarding usage density and facility conditions.

2.2. Case Study Method

In parallel with the literature review, the author uses a case study to verify the feasibility of the proposed design solutions, providing empirical evidence for the theoretical framework. The research applies a single-case study model for in-depth analysis, which is suitable for the architecture and design field.

The representative project selected is the Diplomatic Academy of Vietnam (DAV), designed and constructed by ICADVietnam. This is one of the few educational institutions in Vietnam that has simultaneously implemented all three proposed solutions, ensuring objectivity and visual clarity for the research process.

3. RESULTS AND DISCUSSION

3.1. Current State of School Spaces

3.1.1. Characteristics of the Traditional Model

The traditional model is a familiar form of training that has existed for a long time and is still widely applied in many schools and educational institutions (typically Vietnam National University, Vietnam National University - Hanoi, Vietnam National University - Ho Chi Minh City).



Fig. 1 (source: Internet)

In this model, the training method is primarily teacher-centered (where the teacher transmits knowledge while students receive and memorize it). Traditional school spaces are often confined to classrooms, lecture halls, or laboratories, with an average usable area of 2 sqm per student. The furniture layout prioritizes rigid desks and chairs, limiting movement and flexibility. Consequently, the common teaching methods in this model are mainly one-way, focusing on the teacher's lecture format.

3.1.2. Typical Limitations in Traditional School Spaces

Firstly, the creative potential of students is one of the greatest limitations of the traditional school space model. Soft skills, creative experiences, group interactions, independent thinking, and problem-solving skills of students are still given little attention. In reality, many training facilities lack functional areas for open practice, experiential learning, extracurricular activities, arts, or academic exchange. Spaces for events, community activities, soft skill classes, or showcasing students' creative products are also not fully provided. A school space focused only on traditional teaching functions limits students' comprehensive development opportunities.

Research on the Active Learning Classroom [1] model from

Harvard University shows that students in active learning classes have average exam scores 6% higher and significantly lower failure rates compared to traditional lecture-based classes. It is evident that traditional school spaces make interaction, exchange, and the application of active teaching methods difficult, thereby limiting the quality of the learning experience and students' ability to absorb knowledge.

The second major issue of the traditional school space model is outdated aesthetics and a lack of updates. Outdated design styles still exist in many places, utilizing monotonous and generic color palettes such as white and pale yellow, combined with symmetrical, closed spatial layouts and basic equipment that only meet minimum functional needs. This design method has few focal points, fails to express a unique identity, and lacks focus on students' mental health.

Meanwhile, according to the Clever Classrooms [2] study by Professor Peter Barrett and colleagues at the University of Salford (UK), characteristics of training spaces such as color, light, and visual complexity improved learning outcomes by up to 16%. This shows that enthusiasm, concentration, as well as learning inspiration, are strongly influenced by spatial and aesthetic factors of interior design. School interior design is no longer a secondary factor but a genuine pedagogical tool.

The final issue, and also the most discussed topic in the context of educational innovation, is the lack of technology integration in traditional school space design. Currently, many training facilities have not integrated technological infrastructure for modern teaching and learning. Specifically, some classrooms lack or have poorly arranged projection systems, smart interactive boards, stable network infrastructure for online or hybrid learning, and power outlets or connection points for personal devices of both teachers and students. This lack of synchronization between spatial design and technology infrastructure prevents the learning environment from meeting the requirements of new training models like Active Learning and digital learning.

According to research by Donkin and Kynn [3], up to 77% of students stated that training spaces designed flexibly with technology integration, such as a Collaboration Studio, significantly increased learning motivation compared to traditional classrooms.

3.2. DESIGN SOLUTIONS TO ENHANCE USE VALUE FOR SCHOOL SPACES

In the context of modern and innovative education aiming for comprehensive capacity development, these current statuses and limitations highlight the need for the following solutions to enhance the use value of school spaces:

- * Multi-functional space organization
- * Intentional visual design
- * Technology integration

These three elements complement each other to create a flexible training environment, improve the learning experience, and encourage students to develop independent thinking, creativity, and problem-solving abilities.

3.2.1. Multi-functional Space Organization in Schools

Within the entire school campus, the great hall is considered

the most potential space for exploitation and use due to its large area, open design, and accessibility. This space is suitable for many exploitation purposes such as organizing exhibitions, displaying student products, workshops, or collective training programs. Besides, this is also a location for decoration and providing information to users. From a space that solely played the role of a vital traffic hub, the great hall has become a community activity area and a carrier of the institution's image.

Besides the great hall, other circulation areas can also be exploited more effectively to increase use value. In corridors, "dead zones" or wall niches can be utilized to arrange seating and small tables, creating stops that encourage students to actively study spontaneously and discuss immediately after each class. Integrating power systems and wireless networks (Wi-Fi) serves self-study needs using technology devices, while also adding sound-absorbing materials to reduce noise in the corridor, avoiding affecting those who are studying. Thus, with a single corridor space integrated with a Study Lounge, three functions can be maximized: circulation, rest, and spontaneous active learning.



Fig. 2 (Lumina Academy project - Designed by ICADVietnam)

Continuing from the support spaces outside the classroom, the main classroom area also needs to be organized flexibly to meet diverse teaching methods. Accordingly, mobile furniture systems allow for quick configuration changes to meet various teaching formats such as theory, group discussion, soft skills, or workshops. Large writing boards spanning all four walls increase the teacher's interaction and transmission capabilities while stimulating creativity in students.

On a larger scale, centralized learning spaces like large lecture halls play a supporting role for community-based and large-scale academic activities such as seminars, workshops, and skill classes. It is necessary to ensure good visibility and audio-visual systems suitable for a large area. Additionally, spaces with a high density of users can easily lead to a sense of confinement; therefore, the amount of natural light and ventilation systems also need careful calculation, contributing to improving the student experience.

3.2.2 Graphic Design - Intentional Visual Design

The proposed solution uses neutral tones such as white, beige, and light gray as base colors, occupying about 60-70% of the total surface area, creating Negative Spaces to provide a sense of openness and adaptability to diverse learning activities. Accent colors like blue and light green occupy 20-30%. According to research by Gómez-López et al. [4], using cool colors with high brightness in learning spaces can improve concentration by up to 15%. Additionally, warm colors like orange and yellow with moderate intensity occupy about 5-10% to create visual highlights

at strategic locations like discussion areas or notice boards, thereby promoting social interaction and communication. Color in school spaces can directly impact psychological states and learning efficiency. Choosing an appropriate color palette creates a positive environment, reduces stress, and increases concentration.



Fig. 3 (source: internet)

Besides color, integrating graphic elements and decorative blocks into school spaces does not stop at just "filling the gaps" but also contributes to enhancing the aesthetic value and identity of the training environment. Graphic Walls in traditional areas or student product displays help tell the school's brand story, convey educational philosophies, and inspiring messages. At the same time, using Infographics (such as mind maps, scientific formulas, historical timelines, etc.) turns blank corridor walls into tools for "passive" learning behavior. Additionally, visual numbering systems, icons, and signage also contribute to spatial orientation and increase recognition for each functional area.

Although spatial graphics are effective tools for enhancing aesthetics and conveying information, the overuse of these elements can lead to many unintended consequences. Fixed graphics on wall surfaces with specific content often reduce spatial flexibility when there is a need to change functions or training content, and they also incur renovation costs due to the difficulty of updating. Furthermore, excessive graphic density, strong colors, or complex layouts can cause visual overload, thereby reducing students' concentration. Therefore, the use of graphics needs to be controlled selectively and balanced, prioritizing solutions that allow for content changes to ensure long-term effectiveness.

3.2.3. Technology-Integrated School Spaces

Integrating technology directly into school spaces will enhance teaching quality and the learning experience. Integrated equipment can include projection screens, LED screens, smart TVs, projectors, synchronized sound systems, high-speed Wi-Fi infrastructure in classrooms, and electronic notice boards, attendance machines, and facial recognition cameras in halls and corridors.

According to a 2024 report on digital transformation in education by the Ministry of Education and Training [5], about 70% of educational institutions have implemented online learning platforms. However, only about 45% of classrooms meet digital equipment integration standards. Therefore, synchronous investment in technology infrastructure is necessary to support Hybrid Learning models and improve the operational efficiency of training spaces.

3.3. CASE STUDY: APPLICATION AT THE DIPLOMATIC ACADEMY OF VIETNAM (DAV)

To evaluate the feasibility of the proposed design solutions, the interior design and construction project of the Diplomatic Academy of Vietnam, executed by ICADVietnam, is a typical case. This project applies all solutions regarding multi-functional organization, intentional graphics, and technology integration, thereby contributing to enhancing spatial efficiency and improving the learning experience of students.

3.3.1. Multi-functional Great Hall

The Great Hall was designed by ICADVietnam to increase interaction and information transmission. A Super Graphic Wall recreates the world map with the message "From Viet Nam to the World," reflecting the international integration orientation - one of the core values of the Diplomatic Academy of Vietnam - contributing to creating a unique identity for the school space. Diverse seating is arranged to create rest stops, promoting group discussion and quick exchange for students.



Fig. 4 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)



Fig. 5 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)

In addition, digital display technology is integrated directly into the Great Hall to update daily school activities and learning information, contributing to the efficient use of public space.



Fig. 6 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)

Immediately adjacent is a recessed display cabinet featuring a prominent LED lighting system. It is designed for the purpose of showcasing the representative achievements of students and the institution and conveying information, while simultaneously creating a sense of formality and capturing the attention of passersby. Furthermore, an integrated feedback box is incorporated to increase accessibility, thereby enhancing the overall quality of the training environment.

3.3.2. Study Lounge-integrated Corridors

Study Lounge-integrated Corridors maximize functional utility across three key dimensions: circulation, rest, and learning. The spatial organization features diverse modules—such as benches, standing tables, and wall perches—strategically arranged along both sides of the walls to create dedicated nodes for resting and quick exchanges.



Fig. 7 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)



Fig. 8 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)

Additionally, wall-mounted utility stations integrated with power outlets are installed to fully meet the needs of using tablets, laptops, or personal devices during spontaneous learning throughout the school day.

3.3.3. Classrooms

ICADVietnam applies color design techniques oriented toward spatial psychology to create an optimal learning environment.

The classrooms use white as the primary color, maximizing natural light diffusion to make the space feel open and airy. Additionally, shades such as blue and light green are used on specific wall sections and ceilings, serving as visual accents

while helping students maintain focus throughout the lesson. Simultaneously, warm tones like orange and yellow are used in classrooms dedicated to group work, where interaction is emphasized.



Fig. 9 (Diplomatic Academy of Vietnam project - designed by ICADVietnam)

To facilitate the application of modern teaching methods, ICADVietnam utilizes large boards at the podium and interactive boards at the back of the class, enhancing the teacher's ability to interact and deliver content while sparking creativity in every student.

The classrooms are equipped with mobile display screens and modern projectors, allowing instructors to present content visually and increase engagement during lessons. Additionally, audio systems and Wi-Fi infrastructure are systematically arranged to support online learning activities, group discussions, and access to digital materials within the classroom. This integration of technology ensures the classroom space supports the Hybrid Learning model.

After implementing the above solutions, the functional value of school spaces has significantly improved:

- Over 400 sqm of "dead space" such as the great hall and corridors has been transformed into specific functional spaces.
- The frequency of using the great hall for community events and exhibitions has increased to an average of 3 times per semester.
- Student-accessible learning areas increased from 60% (classrooms/ lecture halls) to 80% (halls, study lounges, etc.) of the total floor area of Building A.
- 100% of learning touchpoints at the school have been synchronized with digital infrastructure. All classrooms and lecture halls are integrated with digital equipment, compared to the national average of 45% [5].

4. CONCLUSION

In summary, through research and practical application, the vital role of interior design methods in enhancing

the functional value of school spaces is clearly evident. Particularly in the context of educational innovation and digital transformation, applying design methods for modern and flexible training space models will create long-term value for the future educational system.

To maximize the potential of training spaces, it is recommended that schools take the following steps:

* **Orient toward multi-functional space organization** to optimize investment costs for physical facilities.

* **Apply intentional graphic design** based on spatial psychology to foster students' creative potential and independent thinking abilities.

* **Integrate technology throughout the school environment** to enhance the learning experience and effectively adapt to new and diverse modern learning models.

* **Collaborate with reputable experts and organizations** experienced in the field of educational space design to ensure the maximum enhancement of space utilization within the school.

By taking these steps, schools will not only build optimal training environments but also contribute to the long-term development of future generations of students.

Conflict of Interest: The author is the Chairman of ICAD Vietnam, the firm that designed and constructed the DAV project used as case study.

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