Competitions: A Pedagogical Framework for Design Education

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Abstract:

Architectural education often struggles to bridge the gap between design theory and real-world performance. Competitions provide structured, systems-based learning that fosters innovation and objective evaluation based on energy, comfort, and feasibility. Highlighting the AIA (American Institute of Architects) Committee on the Environment (COTE) and the U.S. Department of Energy's Buildings NEXT: Student Design Competition, this paper demonstrates how competition-based pedagogy enriches education and equips students with future-ready professional skills.

Keywords: Competitions, Architectural Education, Sustainable Design, Pedagogical Framework

1. Introduction

Architectural education is typically taught in a studio-centric environment, with students taking additional support courses to complement their studio work. Students learn theory and systems and apply them in studio design. The rapid pace of societal change necessitates that students possess the skills needed to enter the profession and address complex problems in the built environment. The current and future architecture and engineering workforces need to acquire new skills to design and develop the interactive and efficient buildings required for the future. Some of those traditional classes lack a performance focus and have limited real-world application. Students need practical, systems-based learning and skills that include a systemic understanding of buildings and energy. A gap remains between practical knowledge and the current status quo in how students learn in architectural education.

To enrich students' learning, competitions are a great tool as structured challenges that simulate real-world constraints that pose an innovative challenge to anyone in education or practice. The designs can be judged on their energy, comfort, and feasibility of the outcome, making the evaluation more objective. Competition minimizes the subjective nature of evaluating the design based solely on graphics and presentation. This paper discusses only competition used at the intersection of climate, people, and energy, considering current constraints.

2. Background

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Architectural competitions have long served as launchpads for design innovation, and numerous historic and culturally significant buildings have been designed by international competition. There are also precedents of students and unknown architects who have risen to fame by winning competitions. Notably, the Vietnam Veterans Memorial Design Competition awarded Maya Lin, a student at the time, a national commission that changed the landscape of memorial architecture (Danto, 1985). In 1956, the Sydney Opera House, an iconic symbol of Australia, was designed as one of the most famous examples; Jorn Utzon was a relatively unknown architect when he won. In the early 1990s, Frank Gehry won the Guggenheim Museum in Bilbao in an invited competition. This design helped catalyze the “Bilbao effect,” boosting the city’s economy through cultural investment. Another example is the group of architects, including Adjaye Associates, Freelon Group, Davis Brody Bond, and SmithGroup, who won the international competition in 2009 for the National Museum of African American History and Culture in Washington, DC. These outstanding designs and buildings demonstrate the significance of how competitions open doors for innovation to shine on the international stage.

Teaching using competitions as a framework is highly beneficial for filling educational gaps and providing students with new skills. There are numerous competitions for students in design, focusing on the use of structure, materials (such as masonry or steel), and real estate. This paper discusses two competitions that intersect energy, community, and design: the American Institute of Architects COTE (Committee on the Environment) and the Department of Energy, BuildingsNEXT (formerly Solar Decathlon Design Challenge).

3. Main Content

3.1 AIA COTE Competition

This annual competition requires students to design submissions that meaningfully address the future impacts of climate change and illustrate a healthy, sustainable, and equitable future. The competition is open to students at the foundational and senior levels. Significant emphasis is placed on achieving zero emissions, adapting to projected climate impacts, designing for resilience, and addressing social and environmental equity. The categories for evaluations are woven with design for integrity, economy, well-being, change, equitable communities, water, energy, resources, and discovery.

Fig. 1, Howard Student team, Team Kai Dixon and Julian Newnham

3.2 Howard University Team Entry, COTE 2025

This student team developed a new design for housing within the cultural context of Jamaica and adapted it to adhere to the competition frameworks. The team worked on a one-semester timeline for the competition. They drew inspiration from local materials to create patterns and also designed passive solar shading devices. The students collaborated on managing their time with their work. They participated in extracurricular activities to challenge themselves and innovate, expanding their own design capabilities. They then populated the design in Sefaira to evaluate energy consumption and then improved it with passive strategies. The innovation of using hydrogen to create energy resilience was demonstrated (Figure 1). The students submitted their projects, which are judged on design innovation and how well they have addressed the measures outlined in the Framework for Design Excellence.

3.3 Buildings NEXT Competition

The Buildings NEXT Student Design Competition (formerly the Solar Decathlon Design Challenge) is an annual collegiate competition where interdisciplinary teams design high-performance buildings that address real-world issues such as existing building retrofits, affordability, and resilience. The ten categories for design and innovation are: Architecture, Engineering, Envelope, Efficiency, Grid-Interactivity, Market, Community, Health, and Presentation. Each of the categories has a specified outcome and is evaluated at both semifinal and final rounds of the competition.

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Fig 2: Howard Student Team, Lumina 2024.

3.4 Howard University, Student Team 2024

The interdisciplinary students worked on a project brief to convert an abandoned historic fire station into affordable housing in New Bedford, Massachusetts. The students in this process were challenged to interact with the community and research a new context to design. The team formulated new programming and designed a Hillman lawn for the community while also creating new meaning for the firehouse (Figure 2). Their design added accessibility and zero energy and developed an affordable market-rate housing design. The students presented their big ideas in the semifinals and won a place in the competition finals. They then completed the zero-energy calculations and presented them at the National Renewable Laboratory in Denver, where they were selected as finalists. The students worked with the community to design an adaptive reuse of the fire station, which would serve the public for a longer time. The students were evaluated in all ten categories and assessed on their ability to answer questions during their final presentation. They also networked with their peers, mentors, and industry professionals in the process and during the final event.

4. Impact and Outcomes

Both competitions encourage energy performance, design, and innovation. The AIA COTE competition has separate categories based on the level of matriculation, including foundation and higher levels. The BuildingsNEXT competition features various design categories, including residential and commercial categories, for students to compete in. The significant difference is that the older format of BuildingsNEXT includes an oral presentation and a semifinal, where teams must be present to win a spot in the final. The new format serves as a showcase for the entire team to present at the event. There are several details regarding the presentation limit of BuildingsNEXT, including the number of pages and the level of detail required. The AIA COTE is open-ended in

terms of more information but has constraints for students to present in two boards. The student teams in both competitions must find a creative way to convey their goals and link them to the competition categories. BuildingsNEXT has a highly rigorous 10-minute final presentation with questions and answers from a unique jury pool. This experience is a close approximation to real practice, where architects present their proposals to multiple stakeholders. This builds confidence and communication skills in the students, especially when they present orally and graphically.

The students on both projects worked in teams. It increased student engagement and creativity within the project. The students worked with mentors in the field and collaborated better. They gained a firmer grasp of real-world energy design and were exposed to presentations in both graphic and oral formats. This experience instilled confidence and provided the students with the skills to work on software like Sefaira to perform energy calculations. The students applied their knowledge of theory in ways that mimic professional expectations, creating close to professional expertise. The competitions require integrated responses—not a siloed solution—which creates logical systems thinking. The competitive element fosters accountability, creativity, and potential recognition, motivating students to expand their skills.

5. Acknowledgment

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6. Conclusion

Competitions have proven to be an effective way to teach and inspire students. Moving forward, competitions can be integrated into curriculum, providing every student with an opportunity to experience the rigor of the program. Competitions exemplify how structured, performance-oriented challenges can transform the learning environment. From first-year students to advanced studios, competitions can be tailored to fit diverse curricular levels. Adding play to learning increases motivation and energizes the learning process.

7. References

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