Engineering Educators Bringing the World Together
2025 ASEE Annual Conference & Exposition
Palais des congrès de Montréal, Montréal, QC • June 22–25, 2025 ASEE
Paper ID #45393

BOARD #116: Enhancing Academic and Professional Trajectories through Competitive Participation: Insights from the 2024 NAHB Student Design Competition

Dr. Behnam Shadravan, Florida A&M University

Associate Professor

Education Ph.D. Civil Engineering, Major: Structure, Minor: Geotechnical, University of Ottawa, ON, Canada(2010) M.S. Civil Engineering, Geotechnical Engineering, Hydraulic Structures, Construction, Sharif Univ. of Technology, Tehran, Iran (1996) B.S. Civil Engineering, Shari

Dr. Doreen Kobelo Regalado, Florida A&M University - Florida State University

ENHANCING ACADEMIC AND PROFESSIONAL TRAJECTORIES THROUGH COMPETITIVE PARTICIPATION: INSIGHTS FROM THE 2024 NAHB STUDENT DESIGN COMPETITION

ABSTRACT

In February 2024, undergraduate students from the Construction Engineering Technology and Architecture programs at our institution participated in two national design competitions under the auspices of the National Association of Home Builders NAHB Student Chapter for the first time, achieving commendable success with the receipt of two trophies. This paper presents the findings from a survey conducted among the students directly involved in the competition projects, those who assisted with the projects, traveled to the International Builders' Show (IBS) in Las Vegas, and served as presenters. The survey aimed to assess the impact of this high-engagement experience on students' educational and professional development. The results suggest significant benefits in areas such as increased motivation, enhanced understanding of the building industry, improved job prospects, and development of key skills including teamwork, leadership, and problem-solving. The data underscores the value of integrating practical competition experiences within academic curricula to enrich student learning and better prepare them for their future careers in the architecture and construction industries. This paper discusses these outcomes in detail, providing insights into how competitive participation aligns with academic and industry objectives, thereby fostering a more comprehensive educational approach.

KEYWORDS

NAHB Competition, Student Engagement, Academic Development, Professional Development, Construction Education, Industry Collaboration, Teamwork Skills, Leadership Training

1. INTRODUCTION

The National Association of Home Builders (NAHB) Student Design Competition is a prestigious event that provides undergraduate students with a platform to engage in real-world construction and design challenges. Each year, students from programs such as Construction Engineering, Construction Engineering Technology and Architecture collaborate in interdisciplinary teams to address complex industry-related projects. The competition serves as a bridge between academia and the professional world, exposing students to the standards, demands, and expectations of the construction and architecture industries.

In February 2024, students from our institution participated in the NAHB Student Design Competition in two categories for the first time, achieving commendable success by winning two trophies. This accomplishment highlighted not only the students' technical expertise but also their ability to work collaboratively, solve problems creatively, and communicate effectively. As part of this initiative, a comprehensive survey was conducted to evaluate the educational and professional impacts of this experience on the participating students.

The primary objective of this paper is to analyze the results of this survey, shedding light on how participating in high-engagement competitions influences students' academic motivation, professional development, and personal growth. Specifically, the paper examines areas such as alignment with university coursework, development of teamwork and leadership skills, and the enhancement of career readiness.

Understanding the educational and professional impact of such competitions is crucial for several reasons. First, it provides valuable insights into how experiential learning methods like competitions complement traditional academic curricula. Second, it highlights the role of competitions in equipping students with industry-relevant skills, such as project management, problem-solving, and technological proficiency. Finally, analyzing the outcomes of such initiatives helps institutions refine their strategies for integrating competitions into their programs, ensuring broader accessibility and maximizing the benefits for future participants.

By presenting a detailed analysis of the NAHB Student Design Competition and its impact on student participants, this paper aims to contribute to the broader discourse on the value of experiential learning in higher education and its potential to prepare students for successful careers in the architecture and construction industries.

2. LITERATURE REVIEW AND BACKGROUND

Student competitions have become a critical tool in enhancing educational outcomes across various disciplines. These events promote experiential learning, a method that bridges the gap between theoretical instruction and real-world application. Studies show that participation in competitions fosters critical thinking, problem-solving, leadership, and teamwork skills [1, 2]. Additionally, competitions provide opportunities for networking, exposing students to industry

professionals and enabling them to build relationships that are instrumental in their career trajectories [3, 4].

Competitions also improve students' self-efficacy and confidence in their abilities. A study by Haidet, et al. (2014) concluded that students who participated in team-based competitions exhibited greater confidence and competence in handling complex problems [5]. Furthermore, competitions provide a platform for students to demonstrate their talents and gain recognition, which can lead to scholarships, internships, and job offers [6]. In the STEM fields, specifically, these events are known to enhance students' interest in pursuing higher education and research [7].

In the fields of construction and architecture, student competitions play a pivotal role in preparing participants for industry challenges. The Architecture, Engineering, and Construction (AEC) industry requires professionals to possess not only technical expertise but also strong interpersonal and collaborative skills [8]. Competitions offer a unique environment where students can work in interdisciplinary teams, mimicking real-world project scenarios [9].

Competitions like the NAHB Student Competition provide students with hands-on experience in project planning, design, and execution. According to Paliwal, et al. (2022), such events are effective in teaching students how to integrate theoretical concepts into practical applications, thereby improving their problem-solving abilities [10]. Building Information Modeling (BIM) competitions, for instance, have been shown to enhance students' technological proficiency, a skill increasingly critical in the AEC industry [11].

Team-based competitions in construction and architecture education foster collaboration and leadership. Students are often required to delegate tasks, resolve conflicts, and manage time effectively to meet project deadlines [12]. These experiences prepare them for the integrated project delivery methods prevalent in the industry [13]. Teamwork assessment can be implemented as a competitive approach by involving students in managing and evaluating team activities [14].

Competitions often involve interaction with industry professionals, offering students valuable networking opportunities. Bern (2021) highlighted that architectural competitions expose students to current industry practices and trends, making them more competitive in the job market [15]. Participants frequently report improved confidence in presenting their ideas, which is a vital skill for client communication in the professional world [16].

Research indicates that competition topics often align with academic coursework, reinforcing classroom learning [17]. Students who participate in competitions report higher motivation to excel academically and professionally, as they see direct applications of their studies in real-world scenarios [18]. This alignment ensures that competitions serve as an extension of the classroom rather than a diversion [19]. Roleplaying games aligned with curriculum goals can be strategically integrated into courses in a competitive format, effectively enhancing student engagement and motivation within their major. [20].

Beyond individual benefits, competitions contribute to the academic reputation of educational institutions. Successful participation in national or international events brings recognition to schools, attracting more students and industry collaborations [19]. Furthermore, competitions encourage innovation, as students often bring fresh perspectives and creative solutions to

longstanding industry challenges [21]. The AEC industry, in particular, benefits from competitions as a pipeline for recruiting talent. Companies sponsoring or judging these events gain early access to skilled and motivated graduates, reducing hiring costs and improving workforce quality [22].
Despite their benefits, student competitions face challenges such as financial constraints, lack of inclusivity, and varying levels of student preparation [23]. Addressing these issues requires increased institutional support, such as funding for travel and resources, as well as mentorship programs to prepare students effectively [24, 25].
Student competitions are indispensable in modern education, particularly in fields like construction and architecture. They bridge the gap between academia and industry, fostering essential skills and providing students with a competitive edge in their careers. As educational institutions continue to integrate competitions into their curricula, addressing barriers to participation will be critical to maximizing their impact [26].

3. METHODOLOGY

3.1. Overview of the Survey Design and Distribution

To evaluate the educational and professional impact of the NAHB Student Design Competition on participating students, a structured survey was developed. The survey consisted of 28 questions, organized into thematic sections, including demographics, competition involvement, alignment with academic coursework, professional preparedness, and personal growth. Questions were designed to capture both quantitative and qualitative feedback, using a combination of multiple-choice, Likert scale, and open-ended response formats.
The survey was distributed to students who directly participated in the 2024 NAHB Student Design Competition as well as those who contributed indirectly, such as assisting with project preparation or attending the event. It was administered electronically via a secure survey platform to ensure ease of access and confidentiality. Participation in the survey was voluntary, and respondents were informed that their feedback would be used solely for academic and research purposes.

3.2.Participants

The survey targeted undergraduate students from Construction Engineering Technology and Architecture programs at our institution. Participants included students who engaged in various roles during the competition:

- *Direct Participants:* Students who worked on competition projects and served as team members responsible for design, technical analysis, and presentations.
- *Presenters*: A subset of direct participants who represented their teams during the formal presentation phase of the competition.
- *Support Roles:* Students who assisted with logistical or preparatory aspects of the competition, such as research, drafting, or documentation.
- *Attendees:* Students who traveled to the International Builders' Show (IBS) in Las Vegas to observe and support their peers.

4. SURVEY RESULTS AND ANALYSIS

The NAHB Student Competition Experience Survey was conducted to evaluate the experiences and perceptions of students participating in the 2023–2024 NAHB Student Chapter and the 2024 Competition. This survey captured insights into participants' demographics, alignment with university coursework, career preparedness, and personal development. The results provide valuable feedback for improving future competitions and enhancing the participant experience. Below is a detailed discussion of some of the survey questions and its results.

4.1. Demographic Information

The demographic data collected included gender, ethnicity, academic major, and academic level as it is demonstrated in table 1.

Table 1. The students Demographic

A. Gender	
Male	13
Female	11

B. Major	Count
Construction Eng. Tech.	15
Architecture	9

C. Ethnicity	Count
African American	20
White	1
Hispanic and Latino	1
African	1
Samoan	1

D. Academic Level	Count
Freshman	2
Sophomore	3
Junior	11
Senior	8

G. Financial Background	
High	1
Medium	14
Low	9

Gender of the participants are Male (13; 54%) and Female (11; 46%). The balanced gender distribution highlights inclusivity in the competition. This is particularly significant in construction and architecture, traditionally male-dominated fields.

The large proportion of 83% of African American participants aligns with the institution's demographics, underscoring the competition’s role in fostering diversity. The presence of participants from other ethnic backgrounds enhances cultural inclusivity and representation.

62% of the participation of Construction Engineering Technology students highlights the competition's relevance to this discipline. The inclusion of 38% of Architecture students reflects the event's interdisciplinary nature of design, fostering collaboration across related fields.

Juniors and seniors formed the majority of 79% of the participants, due to their advanced academic preparation. Strategies to engage more freshmen and sophomores could encourage earlier involvement, providing long-term benefits for their academic and professional journeys.

The predominance of medium (58%) and low-income (38%) participants highlights the importance of providing financial assistance to ensure equitable access to the competition for all students.

4.2. University Coursework Alignment

Overwhelming agreement (90%) reflects the competition's role in inspiring academic excellence. Participants reported that the challenge of the competition pushed them to excel in their coursework.

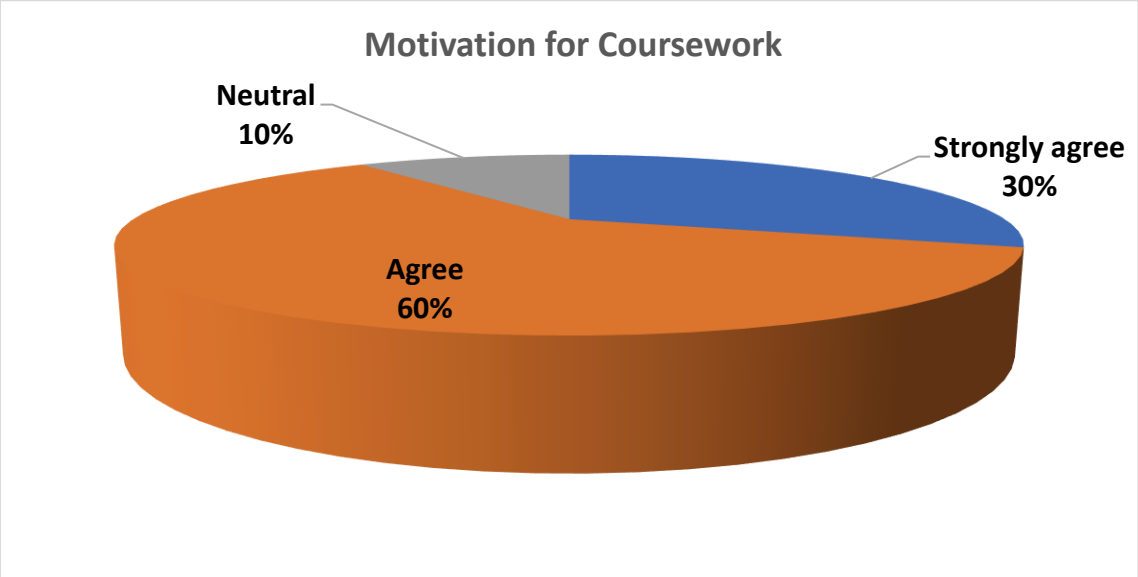

Figure 1. Participating in the competition provided additional motivation to excel in your university coursework. Strongly Agree (6; 30%), Agree (12; 60%), Neutral (2; 10%).

Most participants (90%) found the project relevant to their career aspirations. This alignment underscores the competition's effectiveness in preparing students for industry challenges.

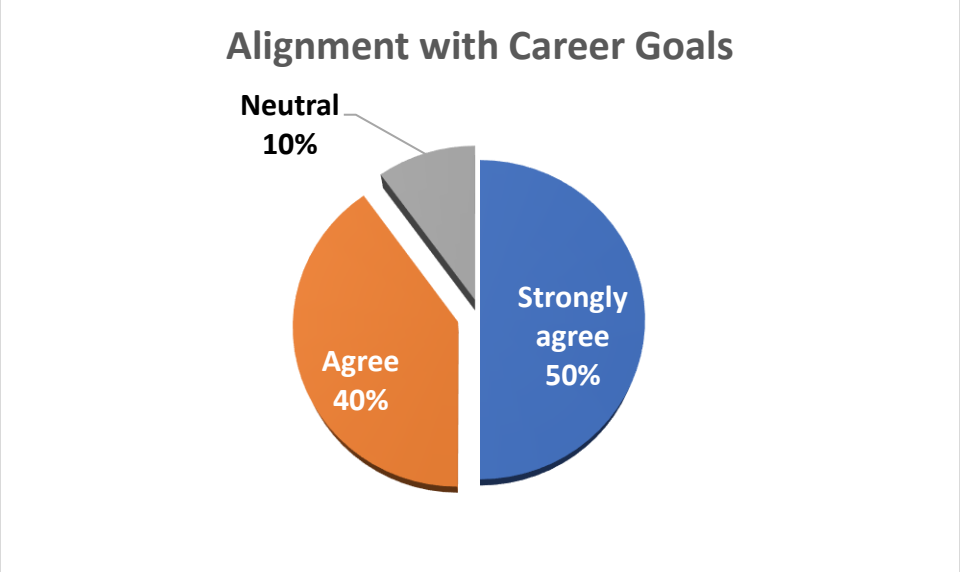

Figure 2. The topic of your project aligned with your future career goals within the industry. Strongly Agree (10; 50%), Agree (8; 40%), Neutral (2; 10%).

The competition provided significant networking opportunities for 85% of participants, highlighting its role as a platform for connecting students with industry professionals.

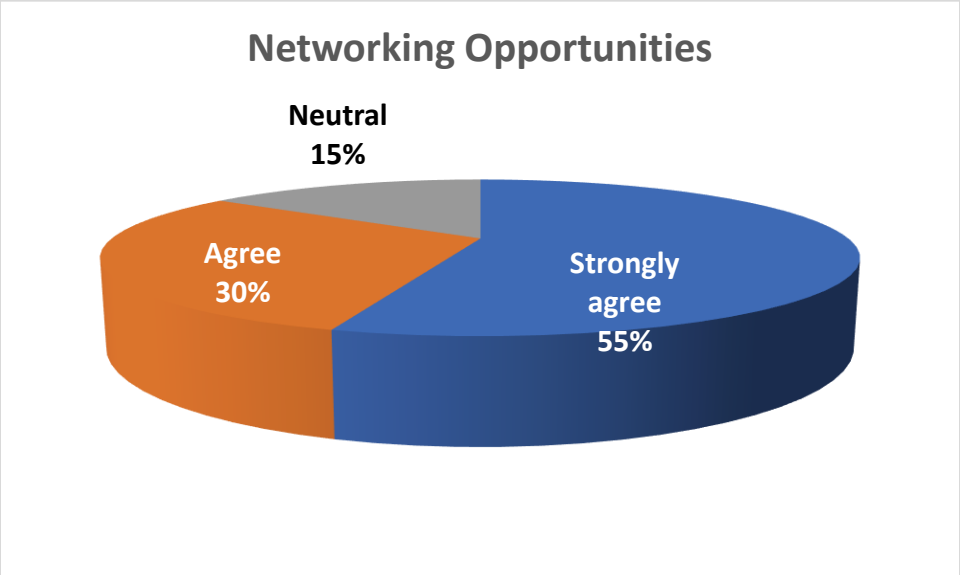

Figure 3. The project process helped you connect with the building industry and provided networking opportunities with industry professionals. Strongly Agree (11; 55%), Agree (6; 30%), Neutral (3; 15%).

All participants agreed that the competition enhanced their understanding of the industry, showcasing its value as an experiential learning tool.

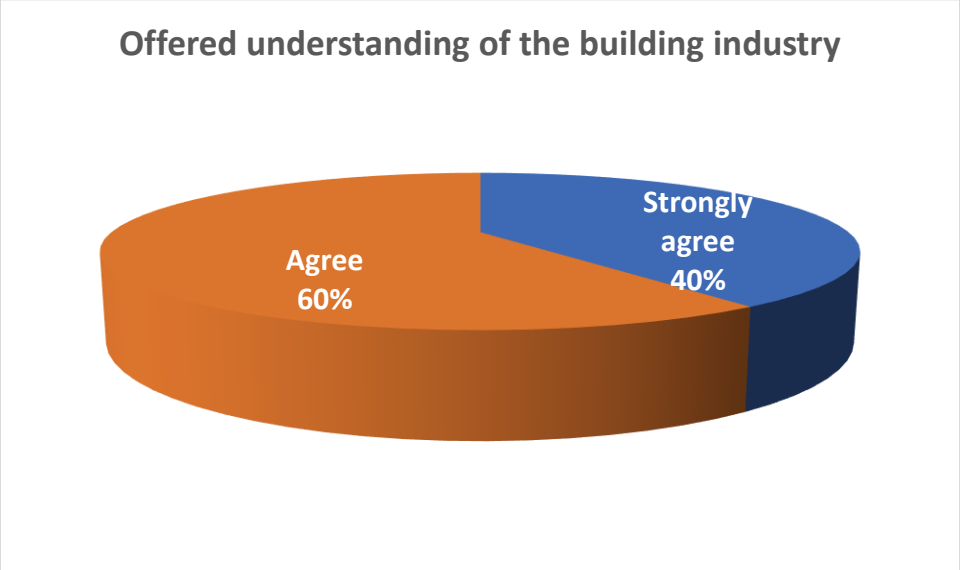

Figure 4. The competition and student chapter offered an enhanced understanding of the building industry. Strongly Agree (8; 40%), Agree (12; 60%).

The competition motivated 85% of participants to remain committed to their major, highlighting its role in reinforcing students' academic and career choices.

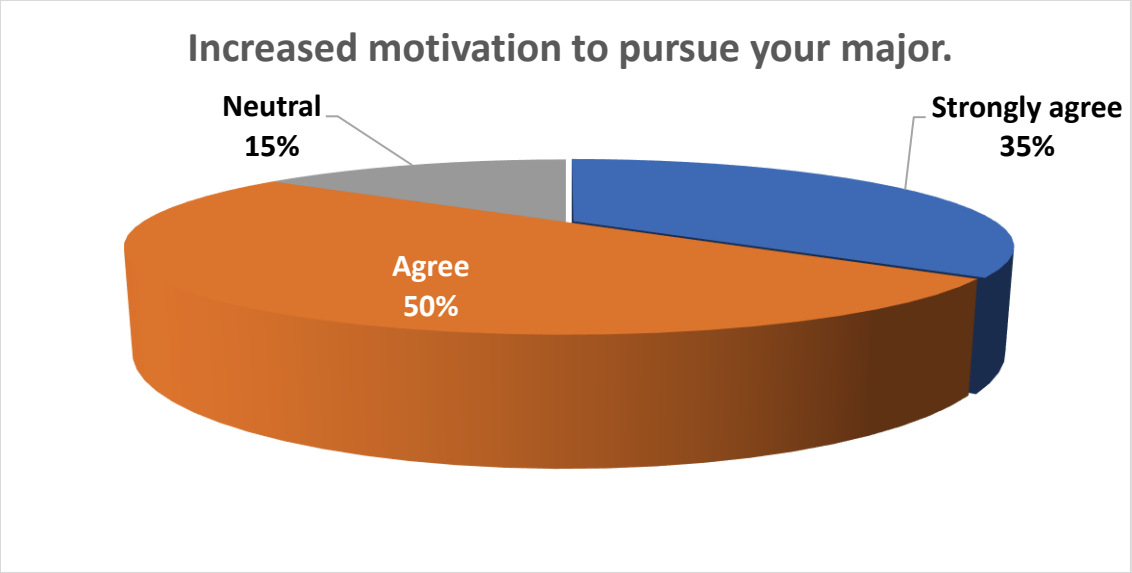

Figure 5. Participation in the competition increased your motivation to pursue your major. Strongly Agree (7; 35%), Agree (10; 50%), Neutral (3; 15%).

4.3. Support

Three-quarters of participants (75%) felt supported by industry representatives, emphasizing the importance of external mentorship. Expanding industry involvement could enhance the quality of guidance provided to students.

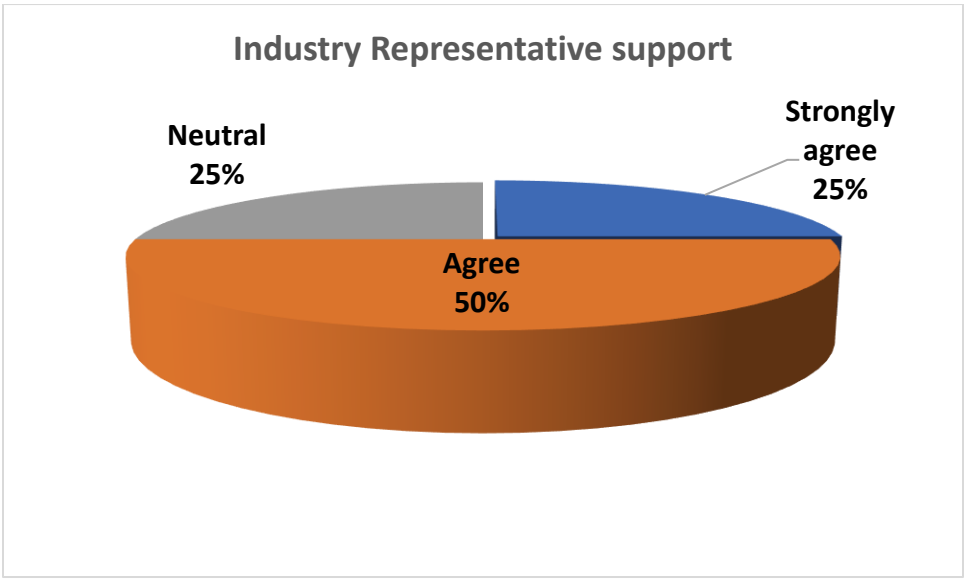

Figure 6. Industry representatives provided significant support during the competition process. Strongly Agree (5; 25%), Agree (10; 50%), Neutral (5; 25%)

The overwhelming support from university advisors reflects their integral role in student success. Additional advisor training or resources could further strengthen this guidance.

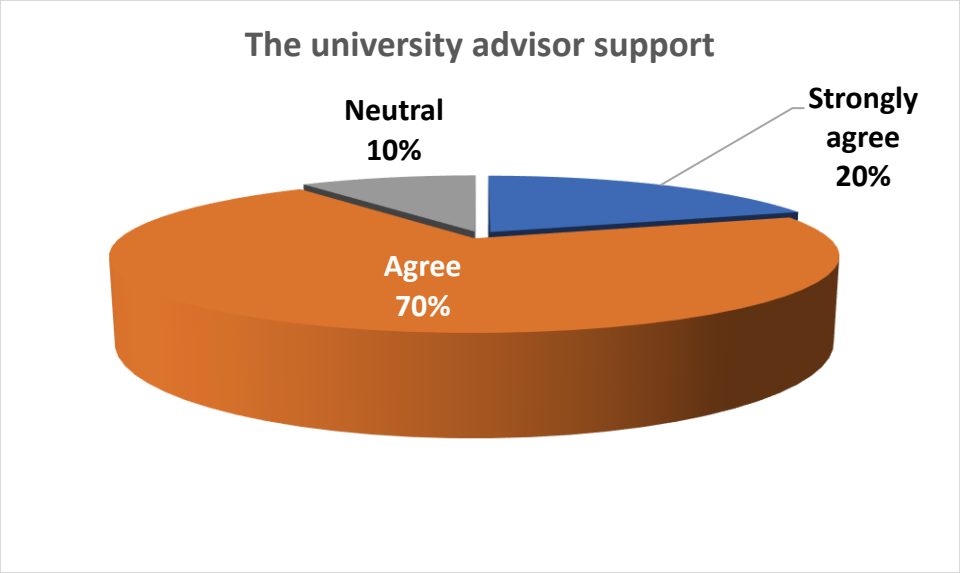

Figure 7. The university advisor offered substantial support throughout the competition process. Strongly Agree (4; 20%), Agree (14; 70%), Neutral (2; 10%).

While 30% found the school's support effective, half remained neutral, and 25% expressed dissatisfaction. Addressing resource allocation and enhancing engagement strategies could improve institutional support.

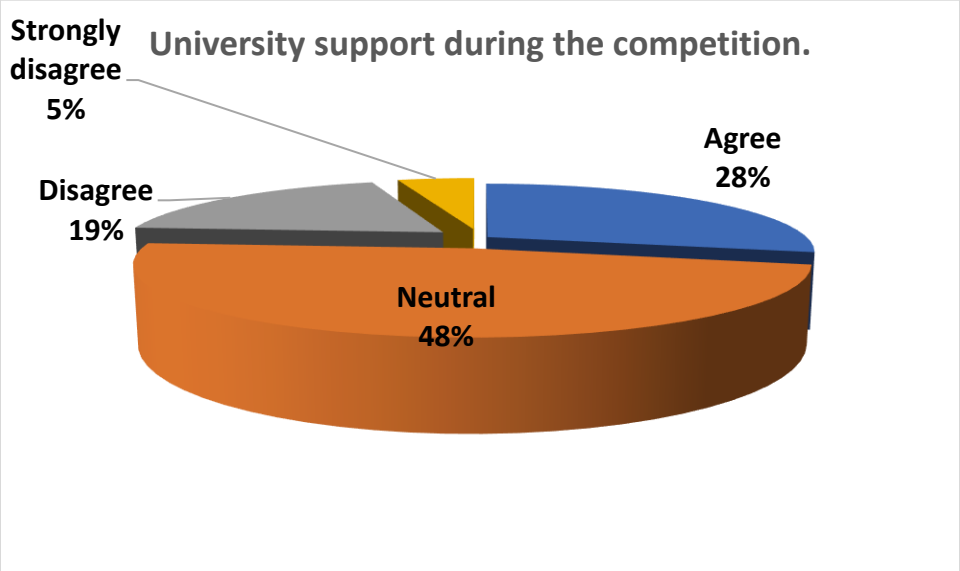

Figure 8. The School of Architecture and Engineering Technology supported you effectively during the competition. Agree (6; 30%), Neutral (10; 50%), Disagree (4; 20%), Strongly Disagree (1; 5%).

4.4. Personal and Social Growth

The competition helped 80% of participants enhance their leadership skills, indicating its value in personal growth. Including more leadership-specific tasks could further benefit students.

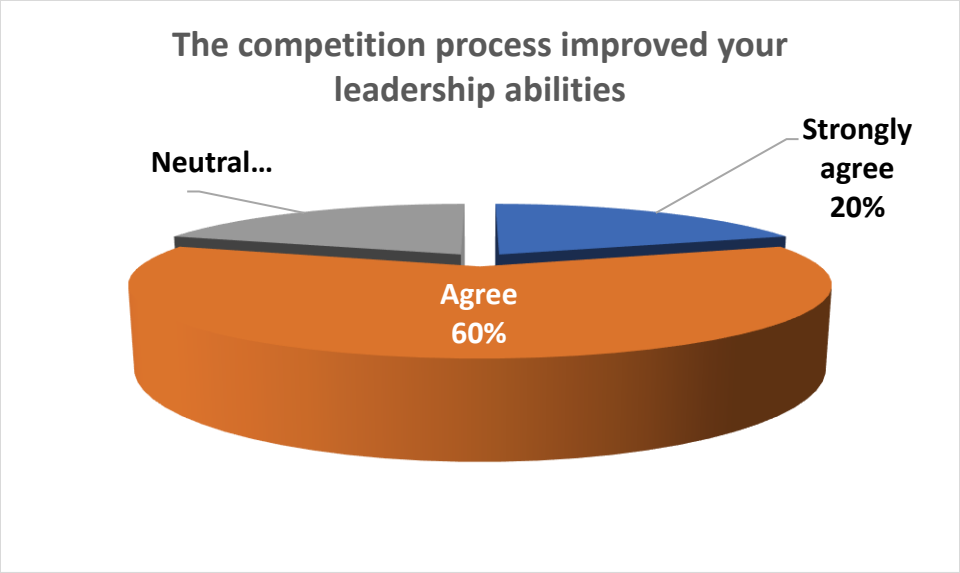

Figure 9. The competition process improved your leadership abilities. Strongly Agree (4; 20%), Agree (12; 60%), Neutral (4; 20%).

Teamwork was a key benefit, with 85% of participants reporting improvements. The collaborative nature of the competition played a crucial role in fostering effective team dynamics.

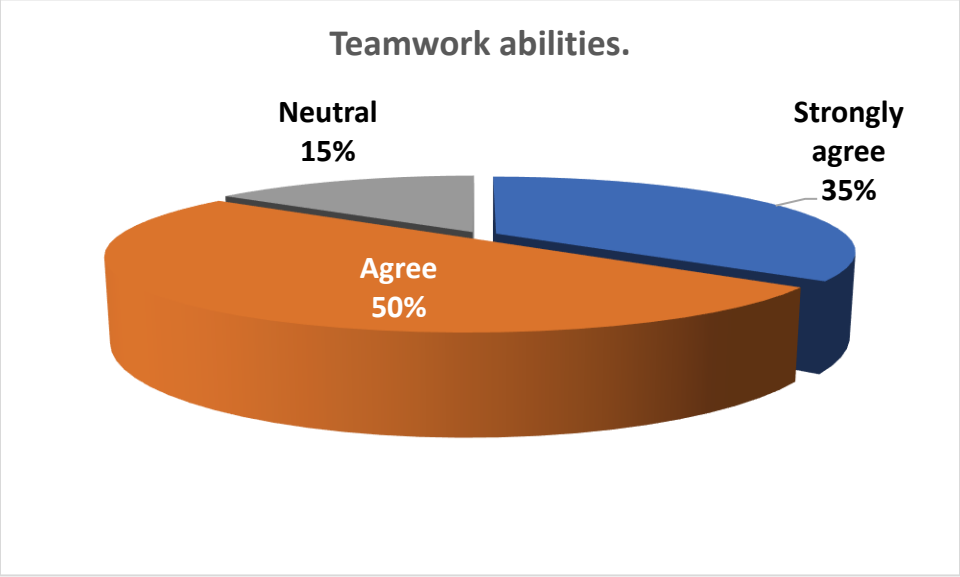

Figure 10. The competition process improved your teamwork abilities. Strongly Agree (7; 35%), Agree (10; 50%), Neutral (3; 15%).

Strengthened friendships were reported by 90% of respondents, highlighting the competition's positive social impact and its role in building a strong peer network.

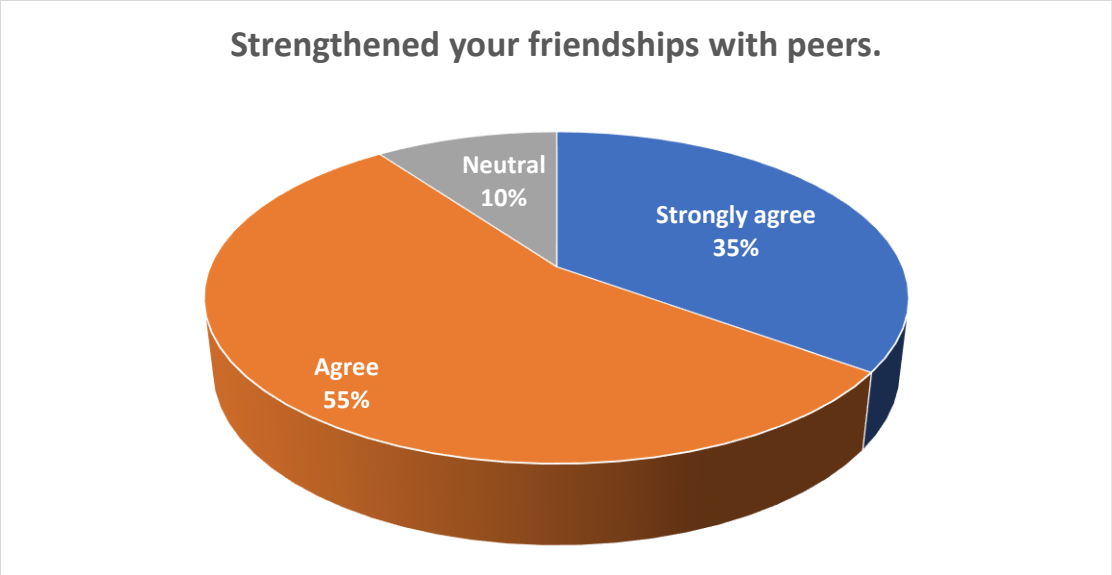

Figure 11. The competition process strengthened your friendships with peers. Strongly Agree (7; 35%), Agree (11; 55%), Neutral (2; 10%).

Most participants (85%) noted improved confidence in presenting ideas, demonstrating the competition's effectiveness in enhancing communication and public speaking skills.

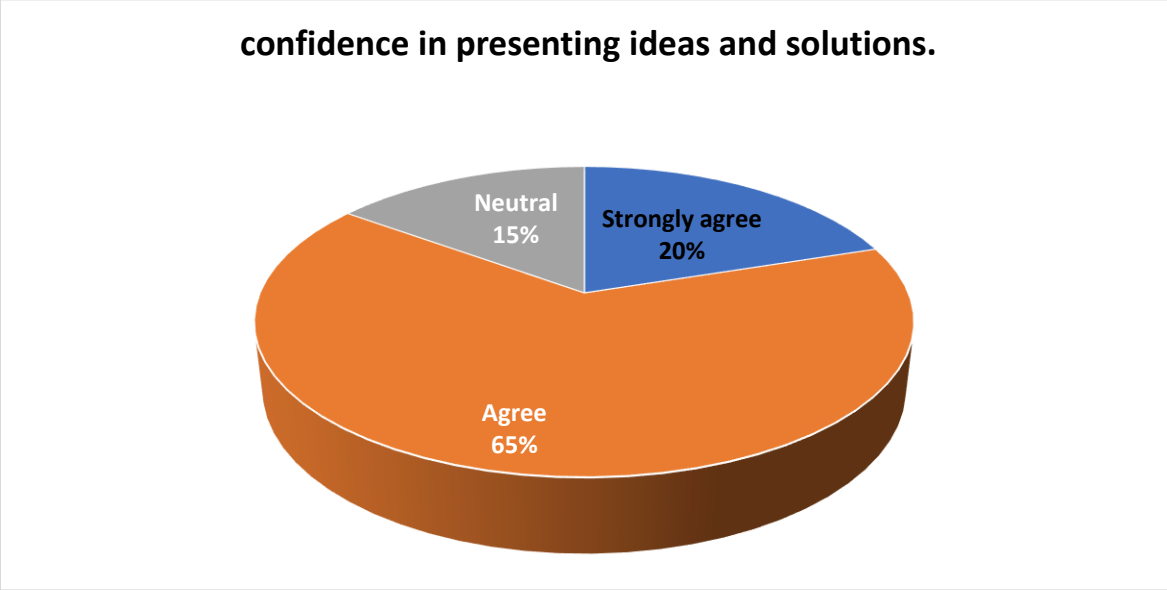

Figure 12. The competition process increased your confidence in presenting ideas and solutions. Strongly Agree (4; 20%), Agree (13; 65%), Neutral (3; 15%).

The competition improved the planning and scheduling abilities of 75% of respondents. Structured deadlines and project timelines contributed significantly to these outcomes.

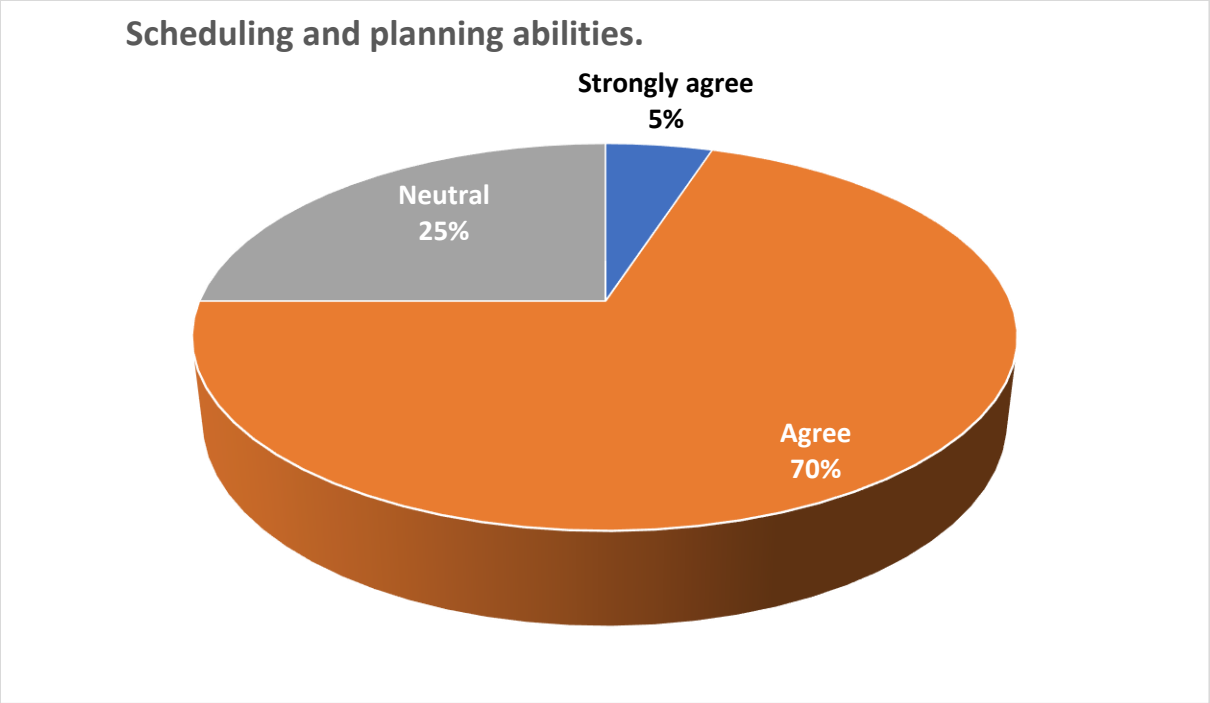

Figure 13. The competition process enhanced your scheduling and planning abilities. Strongly Agree (1; 5%), Agree (14; 70%), Neutral (5; 25%).

An overwhelming 95% of participants recognized benefits extending beyond academics, underscoring the competition's holistic impact on personal and professional growth.

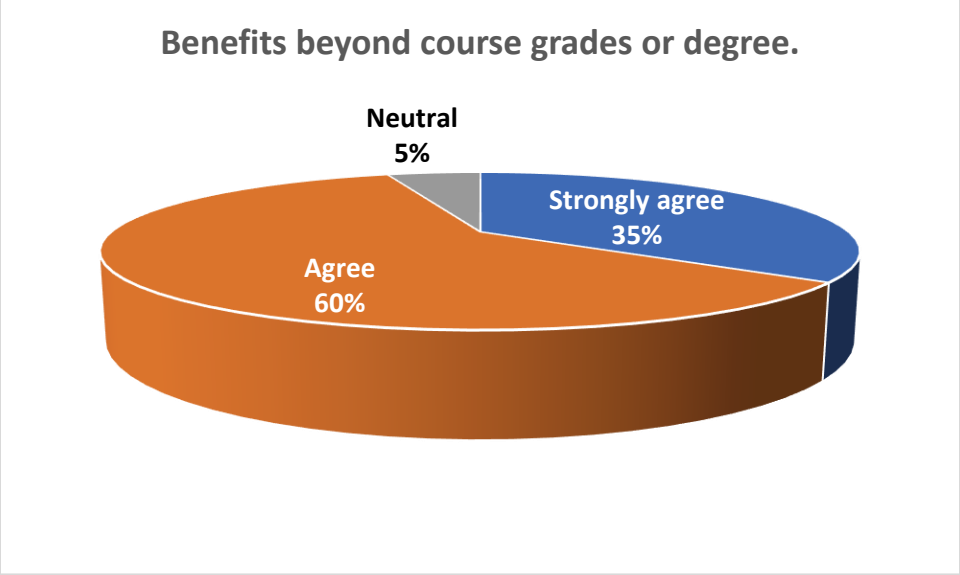

Figure 14. The competition experience offered benefits beyond course grades or degree. Strongly Agree (7; 35%), Agree (12; 60%), Neutral (1; 5%).

The competition helped 80% of participants enhance their critical thinking and problem-solving abilities. Introducing more complex challenges could further strengthen these skills.

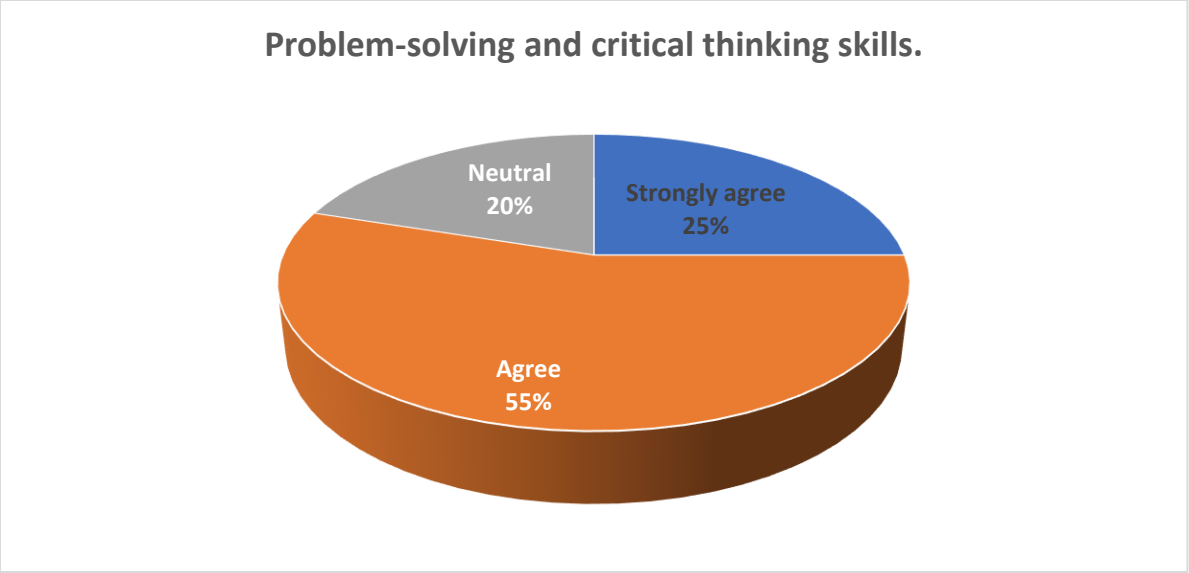

Figure 15. The competition process improved your problem-solving and critical thinking skills. Strongly Agree (5; 25%), Agree (11; 55%), Neutral (4; 20%).

Exposure to new technologies was a notable benefit for 85% of participants. Incorporating cutting-edge tools and methods into future competitions could further enrich this aspect.

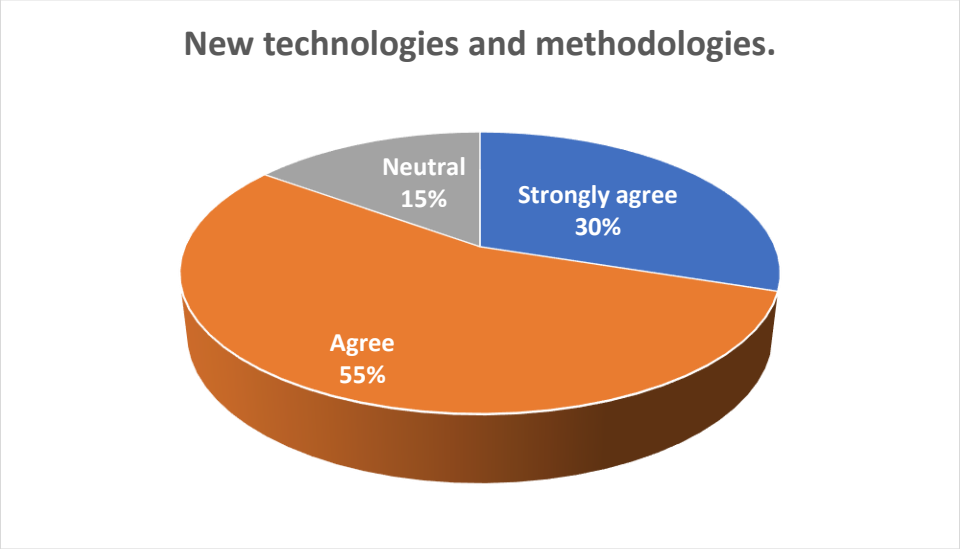

Figure 16. The competition process exposed you to new technologies and methodologies. Strongly Agree (6; 30%), Agree (11; 55%), Neutral (3; 15%).

The overwhelmingly positive response (90%) reflects the competition's success in achieving its objectives. Addressing areas of improvement identified in the survey could further elevate its effectiveness.

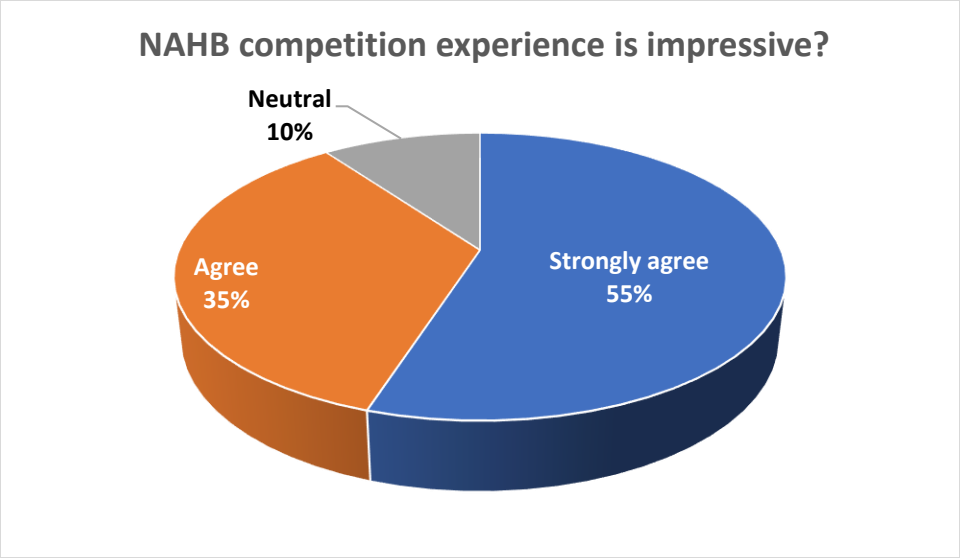

Figure 17. Overall, how impressive would you rate your NAHB competition experience? Strongly Agree (11; 55%), Agree (7; 35%), Neutral (2; 10%).

4.5. Additional Comments and Suggestions

Feedback included comments such as, "Would love to do it again" ,"Expect More financial support from the university," and "Great experience, hoping to return to help earn that gold medal."

The qualitative feedback underscores participants' enthusiasm for the competition and their appreciation of its benefits. Suggestions for increased financial support indicate a key area for improvement to ensure inclusivity and accessibility.

The NAHB Student Competition Experience Survey provided comprehensive insights into participants' experiences, highlighting strengths and identifying areas for growth. By addressing these insights, future competitions can continue to foster academic excellence, career readiness, and personal growth for all participants.

5. DISCUSSION OF RESULTS

5.1. Interpretation of Survey Findings: The results of the NAHB Student Competition Experience Survey provide valuable insights into the demographics, academic alignment, and personal development of participants. These findings highlight both the strengths of the competition and areas for potential improvement.

The results of the survey highlight the transformative impact of the NAHB Student Design Competition on participants' academic, professional, and personal development. Students overwhelmingly reported positive experiences, with key benefits including increased academic motivation, enhanced alignment with coursework, improved career readiness, and strengthened interpersonal skills such as teamwork, leadership, and confidence in presenting ideas.

At the same time, the survey revealed areas where improvements could be made, such as addressing financial barriers to participation and ensuring consistent support from institutional and

industry partners. These insights underline the competition's role as an effective educational tool while offering opportunities for enhancement.

5.2. Demographic Insights: The survey revealed a balanced gender distribution, with 54% male and 46% female participants, reflecting inclusivity in a field traditionally dominated by males. Additionally, 83% of respondents identified as African American, showcasing strong representation from underrepresented groups. This diversity underscores the competition's role in promoting equity and access.

In terms of academic representation, most participants were juniors (46%) and seniors (33%), indicating the competition's appeal to advanced students. However, engaging freshmen and sophomores could foster early interest and skill development. Similarly, the majority of respondents were enrolled in Construction Engineering Technology (63%), with Architecture students comprising 38%, demonstrating the interdisciplinary nature of the competition.

5.3. ***Academic and Career Alignment:*** The competition successfully aligned with participants' academic pursuits, with 85% agreeing that the project topics reinforced their coursework. Additionally, 90% of respondents found the competition motivating for their academic success, reflecting its effectiveness in enhancing educational outcomes. Furthermore, 90% agreed that the projects aligned with their future career goals, indicating the relevance of the competition to real-world industry challenges.

While 45% of respondents felt the competition contributed to job or internship success, the neutral and disagreeing responses suggest room for improvement. Introducing structured career support and stronger industry connections could enhance employability outcomes for participants.

5.4. ***Support Structures*****:** Support from university advisors was rated highly, with 90% of respondents acknowledging substantial guidance. However, only 30% agreed that institutional support from the School of Architecture and Engineering Technology was effective, and 25% expressed dissatisfaction. Addressing these gaps through enhanced resource allocation and active engagement could improve student satisfaction.

Industry representatives played a significant role, with 75% of participants acknowledging their support. Increasing mentorship opportunities and deepening industry involvement could further enrich the learning experience.

5.5. ***Personal and Professional Development:*** The competition significantly enhanced participants' personal and professional skills. Eighty-five percent reported improved teamwork abilities, while 80% experienced growth in leadership skills. Additionally, 85% noted increased confidence in presenting ideas, reflecting the competition's success in fostering communication and interpersonal skills.

On the technical front, 85% of respondents acknowledged exposure to new technologies and methodologies. This underscores the importance of integrating cutting-edge tools into the competition to ensure students are well-prepared for industry advancements.

Social Impact: The competition had a positive social impact, with 90% of respondents reporting strengthened friendships with peers. This camaraderie highlights the event's role in building supportive professional networks and fostering collaboration among participants.

Overall Experience: The competition received an overwhelmingly positive response, with 90% of participants rating their overall experience as excellent or good. Qualitative feedback emphasized the competition's impact on personal and professional growth, with participants expressing a desire to participate again and suggesting increased financial support to enhance accessibility.

*Recommendations for Addressing Gaps**:*** To address the identified challenges, several strategies can be implemented:

Financial Support: Establish dedicated scholarships or funding partnerships to ensure financial constraints do not hinder participation.

Enhanced Mentorship: Increase the involvement of industry professionals in structured mentorship roles, providing students with direct guidance and feedback. The Industry Mentorship Programs aired student teams with industry mentors provided insights, feedback, and guidance throughout the competition process. This collaboration strengthened students' understanding of professional practices and industry expectations.

Networking Events: Networking opportunities organized by industry associations such as presentation or panel discussions with industry professionals, before, during and after the competition. These events facilitated meaningful connections and open career pathways for participants.

Institutional Engagement: Integrate competition preparation into academic curricula, offering credit or recognition for participation, and involve faculty and university in supporting the event.

By addressing these gaps, future iterations of the competition can become even more impactful, ensuring that all students, regardless of background, can fully benefit from this transformative experience.

6. CONCLUSION

The 2024 NAHB Student Competition and accompanying survey results underscore the significant benefits of experiential learning in academic, professional, and personal development.

The 2024 NAHB Student Competition and the accompanying survey results highlight the multifaceted benefits of experiential learning in academic, professional, and personal development. Key insights from the survey include the following:

Academic Motivation and Coursework Alignment: By aligning project topics with theoretical concepts, the competition bridged the gap between classroom learning and practical applications.

Professional Preparedness and Networking Opportunities: Participants gained significant exposure to industry practices and developed key career-relevant skills, such as teamwork, leadership, and project management and Networking opportunities.

Personal Growth and Skill Development: The competition played a pivotal role in participants' personal growth, particularly in building confidence, teamwork, and leadership abilities.
Challenges Identified: Financial constraints emerged as a key barrier, with 38% of participants reporting low financial backgrounds. Additionally, variations in institutional support were noted, with 25% expressing dissatisfaction. Addressing these challenges is crucial for ensuring inclusivity and maximizing the competition's benefits for all participants.
To build on its successes and address the challenges, the following recommendations are proposed:

- Enhance financial accessibility through scholarships and travel subsidies.
- Expand academic and industry mentorship programs with industry and academic professionals.
- Increase engagement and create more student leadership and presentation opportunities.
- Integrate emerging technologies such as AI, printing, and sustainable construction practices.

The 2024 NAHB Student Competition has demonstrated its value as both an educational tool and a professional development platform. By effectively integrating academic learning with practical application, the competition has prepared students for real-world challenges, strengthened industry connections, and fostered personal growth. Future iterations of the competition should continue to build on these strengths while addressing the identified gaps, ensuring transformative and inclusive learning experiences for all participants. These efforts will not only enhance the competition's impact but also contribute to the development of a skilled, diverse, and industry-ready workforce in the architecture, engineering, and construction (AEC) fields.

7. ACKNOWLEDGEMENTS

The author extends our deepest gratitude to Kerwyn Jones Wilson, President of Future Builders of America (FBA), and Cindy Hall, FBA Director, for their unwavering support and leadership throughout the 2024 NAHB Student Competition. Their dedication to fostering the next generation of builders has been invaluable to the success of this program.
The author wishes to express heartfelt thanks to the Home Builders of the state and the National Association of Home Builders (NAHB) for their partnership and providing students with this transformative opportunity to engage with the building industry and develop professional skills.
Special appreciation goes to dedication, hard work, and vision of the students who participated in 2024 competition, particularly Demayla Jenkins and Elison Decarvalho, the NAHB Student Chapter President and Vice-President, respectively, for their exemplary leadership and commitment, London McSwain and Junie Saint Juste, and Jasmine Walker, the student competition team captains, for their outstanding efforts in guiding their teams and ensuring the success of this initiative.
Their contributions have been instrumental in making the 2024 NAHB Student Competition a rewarding and inspiring experience for all involved.

8. REFERENCES

1. Konak, A., Kulturel-Konak, S., Schneider, D. R., & Mehta, K. (2024). Enhancing student learning in innovation competitions and programs. *European Journal of Engineering Education*, 1-21.
2. Kolb, D. A. (2015). Experiential Learning: Experience as the Source of Learning and Development. *Prentice Hall*.
3. Smatanová, K., Kamenská, M., & Šeligová, A. (2021). Effects of student architecture competitions on learning outcomes in design studio courses. *World Trans. on Engng. and Technol. Educ*, *19*(3), 313-318.
4. Faragallah, R. N. (2024). Architectural Competitions: An Innovative Tool for Developing Architecture Education and Professional Practice. *Fayoum University Journal of Engineering*, *7*(1), 91-106.
5. Haidet, P., Kubitz, K., & McCormack, W. T. (2014). Analysis of the team-based learning literature: TBL comes of age. *Journal on excellence in college teaching*, *25*(3-4), 303.
6. Ao, Y., Peng, P., Li, M., Li, J., Wang, Y., & Martek, I. (2024). Empowering architecture, engineering and construction students through building information modeling competitions: a deep dive into behavioral motivation. *Engineering, Construction and Architectural Management*.
7. Miller, K., Sonnert, G., & Sadler, P. (2018). The influence of students' participation in STEM competitions on their interest in STEM careers. *International Journal of Science Education, Part B*, *8*(2), 95-114.
8. Wang, Z., Leicht, R., & Solnosky, R. (2025). Importance of Interdisciplinary Learning in Achieving AEC Industry Success. *Journal of Civil Engineering Education*, *151*(1), 04024004.
9. Woodcock, C. S. E., Callewaert, J., & Millunchick, J. (2021). Synthesizing definitions of professional competencies linked to experiential learning in engineering education: A literature review. *Journal of Higher Education Theory and Practice*, *21*(4), 123-146.
10. Paliwal, M., Rajak, B. K., Kumar, V., & Singh, S. (2022). Assessing the role of creativity and motivation to measure entrepreneurial education and entrepreneurial intention. *International Journal of Educational Management*, *36*(5), 854-874.
11. Lee, B., & Park, S. K. (2022). A Study on the Competitiveness for the Diffusion of Smart Technology of Construction Industry in the Era of 4th Industrial Revolution. *Sustainability*, *14*(14), 8348.
12. Murphy Dr, R., Concannon, R., & Seriki Dr, O. (2023). Leadership For The Future: Towards The Challenge Of Understanding Leadership in The AEC Sector.

13. Forgues, D., & Becerik-Gerber, B. (2013). Integrated project delivery and building information modeling: Redefining the relationship between education and practice. *International Journal of Design Education*, *6*(2), 47-56.

14. Shadravan, B. (2023, June). Teamwork Assessment in Construction Undergraduate Courses. In *2023 ASEE Annual Conference & Exposition*.

15. Bern, A. (2021). Architecture competitions in an urban planning context. In *Urban Transformations through Exceptional Architecture* (pp. 75-92). Routledge.

16. Wolfinbarger, K. G., Shehab, R. L., Trytten, D. A., & Walden, S. E. (2021). The influence of engineering competition team participation on students' leadership identity development. *Journal of Engineering Education*, *110*(4), 925-948.

17. Kim, G. M., & Johnson, L. L. (2021). Playful practices: Reimagining literacy teacher education through game-based curriculum design. *Research in the Teaching of English*, *55*(3), 241-264.

18. McCarthy, J. (2015). Motivation in team-based competitions. *Journal of Applied Learning in Higher Education*, 7(1), 1-15.

19. Musselin, C. (2018). New forms of competition in higher education. *Socio-Economic Review*, *16*(3), 657-683.

20. Shadravan, B. (2022, August). An innovative Practice of Critical Thinking in an Undergraduate Construction Course Project. In *2022 ASEE Annual Conference & Exposition*.

21. Rajan, J. (2024). The competitive advantage of prioritizing human-centered design thinking in business.

22. Yusuf, A. O., Akanmu, A. A., Murzi, H., Nieto-Leal, A., Ofori-Boadu, A. N., & Ball, S. (2025). Instructors' Considerations When Collaborating with Practitioners for Future Workforce Development. *Journal of Civil Engineering Education*, *151*(2), 04024010.

23. Debs, L., Romero Moraes, F., & Benhart, B. (2022, May). A Review and Comparison of Associated Schools of Construction (ASC) Capstone Course Content. In *2022 ASC 58th Annual Schools of Construction International Conference* (pp. 577-585).

24. DeMatthews, D. E., Serafini, A., & Watson, T. N. (2021). Leading inclusive schools: Principal perceptions, practices, and challenges to meaningful change. *Educational Administration Quarterly*, *57*(1), 3-48.

25. Tinto, V., & Pusser, B. (2006). Moving from theory to action: Building a model of institutional action for student success. *National Postsecondary Education Cooperative*, *1*(51), 89-125.

26. Krücken, G. (2021). Multiple competitions in higher education: a conceptual approach. *Innovation*, *23*(2), 163-181.