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Motivational Factors Influencing Construction Students' Engagement in National Competitions

Saeed Rokooei[1], Mohsen Garshasby[1], and Tulio Sulbaran[2]
[1]Mississippi State University, [2]University of Texas at San Antonio

This study examines construction students' perceptions, familiarity, and interest in participating in major national competitions as experiential learning platforms. In this paper, questionnaire survey data collected from 213 construction students indicate that most participants have limited prior exposure to competitions but view them as valuable for enhancing knowledge, teamwork, and professional networks. Descriptive analysis revealed that while general awareness and past experience are low, students widely recognize competitions as useful learning and engagement opportunities. Correlation analyses found no significant relationship between students' GPA or work experience and interest in competitions, suggesting that academic achievement and professional background do not influence motivation to participate. However, students' perception of competition usefulness showed a significant positive relationship with their interest in the two main construction student competitions. Furthermore, the two competitions were strongly correlated, suggesting they appeal to similar student groups. Qualitative responses supported these findings, emphasizing construction knowledge, industry connections, teamwork, and leadership as key benefits. The results highlight that awareness and perceived value, rather than academic or experiential factors, are the strongest motivators for participation, underscoring the critical role of educators in promoting, integrating, and demonstrating the educational and professional relevance of construction student competitions.

Keywords: Construction, Competition, Student Learning, Extracurricular activities

Introduction

Competition-based learning (CBL) has gained traction as a high-impact educational strategy in construction management programs, providing students with experiential opportunities to apply technical and managerial concepts in realistic project scenarios. National competitions such as the Associated Schools of Construction (ASC) and the Associated Builders and Contractors (ABC) events serve as immersive platforms that connect academic learning with industry expectations. These competitions replicate professional workflows; including estimating, scheduling, and safety planning, while requiring teams to present their work before industry judges, thereby developing essential teamwork, leadership, and communication skills (Bigelow et al., 2013 & Meekel & Kilby, 2017 & Stanford et al., 2020). Recent evidence highlights that competition-based learning significantly enhances student engagement, motivation, and performance by combining intrinsic motivation with authentic, real-world challenges (McGuire, 2025). In the context of construction education, competitions offer a structured environment for experiential learning and industry networking,

aligning well with accreditation outcomes and employability goals. However, despite their educational value, student participation in these competitions remains uneven across institutions, with barriers including time demands, limited awareness, and perceived lack of relevance (Bigelow et al., 2013).

This study investigates students' perceptions, motivations, and barriers related to national construction competitions, specifically focusing on the ASC and ABC events. By analyzing survey data from students, it explores how perceived usefulness, prior experience, and academic factors influence their interest in participation. The findings aim to inform educators on how to enhance student engagement and better integrate competition-based learning within construction management curricula. Building on these insights, the study provides actionable guidance for construction faculty advisors and competition organizers on how to intentionally design, promote, and scaffold competition experiences so they more effectively support student learning outcomes, professional preparation, and long-term involvement within the construction education community.

Background

The concept of competition-based learning builds on motivational and experiential learning theories that emphasize learning through challenge, collaboration, and applied problem-solving (Wang and Huang, 2023; Ao et al., 2022). Carroll (2013) described CBL as an extension of project-based learning that introduces healthy competition to sustain motivation and deepen cognitive engagement. Desei et al. (2014) similarly demonstrated that integrating competition and problem-based learning improves teamwork and engagement outcomes in project management education. Within engineering and construction contexts, CBL has been shown to improve technical mastery, leadership, and professional competence (Barry et al., 2013; Ao et al., 2025; Aibinu et al., 2021). Building on this foundation, prior research has highlighted several specific factors that shape students' decisions to engage in or avoid competition-based activities, including familiarity with competitions, perceived usefulness, time constraints, and institutional encouragement. Studies in engineering education have shown that when students understand the goals, structure, and relevance of competitions, they are more likely to perceive them as legitimate learning opportunities rather than optional extracurricular tasks, which in turn strengthen motivation to participate (e.g., through increased awareness and clearer expectations).

However, much of this work has focused on documenting learning outcomes and instructional designs, with comparatively less attention to how students initially perceive competitions, what deters them from participation, and how these perceptions vary across academic and experiential profiles. Existing studies rarely examine systematic relationships between perceived usefulness, prior experience, and stated interest in competitions, particularly within construction programs anchored in ASC activities. As a result, there is limited empirical evidence to guide construction educators on how to strategically promote competitions and lower participation barriers at the program level. McGuire (2025) confirmed that competition-based learning fosters intrinsic motivation by linking student effort with tangible, real-world outcomes. Likewise, Bigelow et al. (2013) found that construction students perceive significant professional benefits from participation in national competitions but are often limited by time constraints and lack of institutional support. These findings suggest that students' perceptions of cost (e.g., workload, schedule pressure) and benefit (e.g., career advancement, skill development) jointly influence their willingness to commit the time needed for preparation and travel. Research on experiential and project-based learning further shows that students' prior exposure to industry settings and their confidence in applying classroom knowledge can affect how relevant and attainable competition experiences appear, helping to explain why work experience, self-efficacy, and anticipated performance are often examined alongside interest in participation. These findings echo

broader educational research showing that authentic, collaborative competition environments enhance learning effectiveness and persistence (Desai et al., 2014; Maue, A. D., & Walsh, 2020; Wei, 2015). Collectively, this literature highlights the potential of competition-based learning to strengthen construction education by blending experiential practice, motivation, and industry exposure. Yet, as participation remains inconsistent, understanding the motivational factors influencing students' decisions to engage becomes vital for educators aiming to institutionalize such opportunities within their curricula. Consequently, examining constructs such as familiarity, perceived usefulness, time availability, self-confidence, prior competition experience, and academic standing provides a theoretically grounded way to investigate why some construction students embrace some competitions while others remain disengaged.

Methodology

This study used a quantitative survey approach to examine motivational factors influencing construction students' engagement in national competitions such as the Associated Schools of Construction (ASC) and Associated Builders and Contractors (ABC) events. The instrument was developed using established competition-based learning and motivation frameworks from construction and engineering education. The survey was developed by drawing directly on prior research on competition-based learning and on core components and learning outcomes of ASC and ABC competitions, ensuring that all items reflected relevant educational benefits and known participation barriers. Questions targeted students' familiarity, perceived usefulness, motivations, and constraints, and a 5-point Likert scale (1 = Very Low, 5 = Very High) was used throughout to maintain consistency and enable meaningful comparison across constructs. The full study protocol, including survey content and recruitment procedures, received Institutional Review Board approval (IRB-25-423), confirming its ethical and methodological rigor. Undergraduate Building Construction Science students from Mississippi State University participated voluntarily during the Fall 2025 semester and after the data cleaning, a total of 213 acceptable responses were collected. The online questionnaire, conducted through Qualtrics, included Likert-scale and open-ended items measuring familiarity, perceived usefulness, motivational drivers, and barriers to participation in ASC and ABC competitions. Descriptive statistics summarized familiarity, usefulness, and interest levels. Inferential analysis was conducted using Spearman's rank correlation to examine relationships among key variables: academic performance (GPA), field and office work experience, perceived usefulness, and interest in participation. Cronbach's alpha values for the motivators and impediments scales were 0.806 and 0.701, respectively, indicating acceptable internal consistency for both measures. Statistical significance was set at $p < .05$. This combination of descriptive, correlational, and qualitative analysis provided a comprehensive understanding of the motivational factors that affect construction students' engagement in competition-based learning.

Results

Descriptive Analysis

In the first section, students were asked, "To what extent are you familiar with student competitions in construction?" to gauge their awareness of opportunities such as the ABC and ASC events. As Table 1 shows, most construction students reported limited familiarity with these competitions. Over half of the respondents (53%) indicated either a very low (22%) or low (31%) level of familiarity, while about one-third (31%) rated their familiarity as moderate. Only a small proportion expressed high (13%) or very high (3%) familiarity. These findings suggest that awareness and exposure to construction-related student competitions remain relatively low among students, highlighting a

potential need for greater promotion and incorporation of these events into construction education programs.

Table 1. Familiarity with student competition (%)

Level	Percent
Very Low	22
Low	31
Moderate	31
High	13
Very High	3

In the second question, students were asked, "To what extent do you believe student competitions are useful engagement during the construction program?" to assess their perceived value of such activities. A large majority viewed student competitions positively. Nearly half of the respondents (45%) rated their usefulness as high, and another 12% rated it as very high. Meanwhile, 40% selected a moderate level of usefulness, suggesting that most students recognize at least some benefit. Only a small percentage rated the usefulness as low (2%) or very low (1%). Overall, the results indicate that construction students generally perceive student competitions as valuable experiences that enhance engagement and learning within their academic programs.

In response to rating the impact of student competitions on various aspects of the construction education experience, students stated consistently high positive perceptions across all items. The greatest perceived benefit was for developing a professional network, where ratings for "high" and "very high" were most prominent. Gaining additional construction knowledge and engaging in a fun activity were also seen as significant benefits, receiving strong positive scores. Attending career fairs during competitions and meeting students from other schools had relatively lower, but still notable, high impact ratings, with slightly more students marking these items as "moderate." Overall, very few respondents rated any item at the "low" or "very low" levels, suggesting strong overall appreciation for the multifaceted opportunities provided by student competitions within construction programs. The percentage of each level is shown in Figure 1.

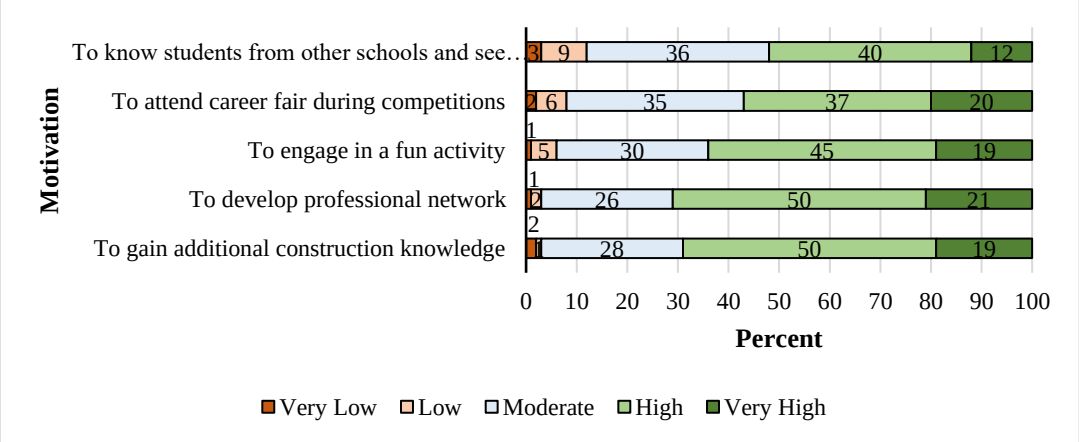

Figure 1. Student competition motivations

When rating factors affecting their decision not to participate in student competitions, construction students indicated that lack of time and unfamiliarity with competitions are moderately important barriers, with about one-third of respondents selecting the "moderate" level for these reasons. Notably, a large proportion rated "not liking this type of activity," "not knowing the benefits," and low confidence in ranking or contributing as low or very low importance, suggesting these factors

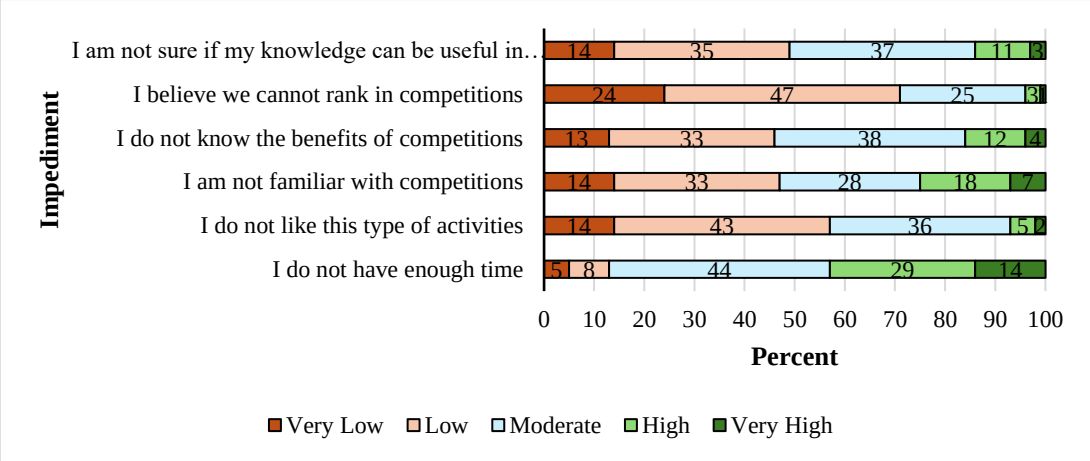

Figure 2. Student competitions impediments

deter relatively fewer students. The most prominent barrier was "believing we cannot rank in competitions," which received the most "low" ratings, indicating it is less influential as a deterrent than others (Figure 2). Overall, while multiple concerns exist, time constraints and lack of awareness remain the most significant factors influencing non-participation.

When asked about their interest in joining the ABC and ASC Competition teams, the majority of students exhibited either medium or low interest, with very few expressing high enthusiasm. Interest levels were nearly identical for both competitions: 49% (ABC) and 48% (ASC) indicated medium interest, while 29% (ABC) and 28% (ASC) selected low interest. Only a small minority showed high interest (7% for ABC and 9% for ASC) while 15% of respondents for each competition indicated no interest at all, as shown in Figure 3. These results suggest that while outright disinterest is limited, strong enthusiasm to participate remains low, with most students falling in the moderate range of interest.

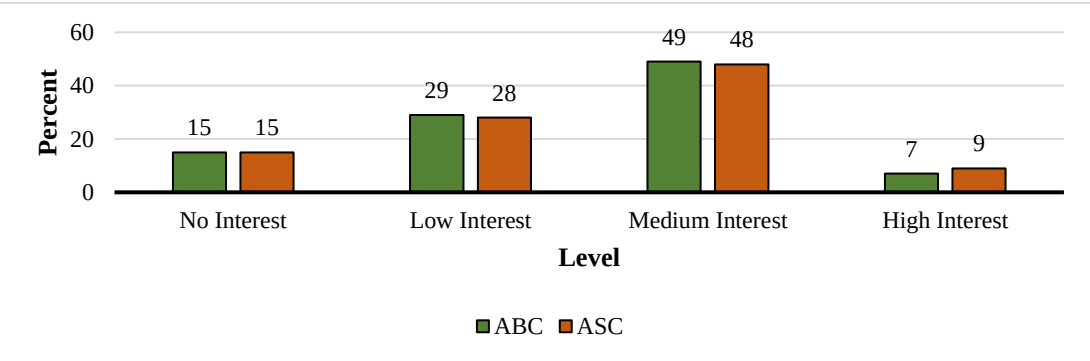

Figure 3. Interest in ABC and ASC competitions

Students were asked how many hours per week they could dedicate to preparing for competitions during the complete fall semester (August to December). The responses show that most students are willing to commit between 3.5 and 7 hours weekly, with far fewer able to dedicate more than 7 hours per week. Importantly, there were no substantial differences in these reported time commitments across the fall semester, the period between the fall and spring semesters, and the first eight weeks of the spring, indicating consistent willingness to prepare regardless of timing. Overall, students favor a moderate, steady preparation schedule over an intensive one (Table 2).

Table 2. Availability of students for competition preparation (%)

	Fall semester	**between the Fall and Spring semester**	**first 8 weeks of the Spring**
3.5 to 7 hours per week	55	56	55
7 to 10.5 hours per week	26	25	28
10.5 to 14 hours per week	16	11	10
14 to 21 hours per week	3	8	7

Students were asked whether they had previously participated in any construction or STEM-related competitions at the high school, community college, or university level. A significant majority (83%) reported no prior participation, while only 17% indicated they had been involved in such events. Among those with experience, responses mentioned a range of competitions, including the NAHB and ASC competitions, engineering and robotics contests, high school HVAC and cabinetry challenges, Eco Car, SkillsUSA, and the Science Olympiad. These responses demonstrate that while a small portion of students have prior exposure to hands-on, competitive learning environments, most have yet to participate in activities that blend technical skills with collaborative problem-solving, highlighting an opportunity to expand awareness and involvement in such experiential learning opportunities.

Students were also asked about their construction work experience, overall as well as specifically in field and office positions, with all responses provided in percentages. More than half of students (54%) reported having no office experience, compared to 28% with no field experience and 22% with no overall construction experience. The most common category for field and office experience was 1-6 months (32% field, 33% office), while for overall experience, 7-18 months was just slightly higher (29%). Only small percentages of students reported substantial experience, with 19-30 months or more accounting for 11-13% in field roles and less than 3% in office positions. As shown in Figure 4, these results show that the majority of students have limited industry experience, with their exposure more likely to occur in short-term field or office roles rather than long-term engagement.

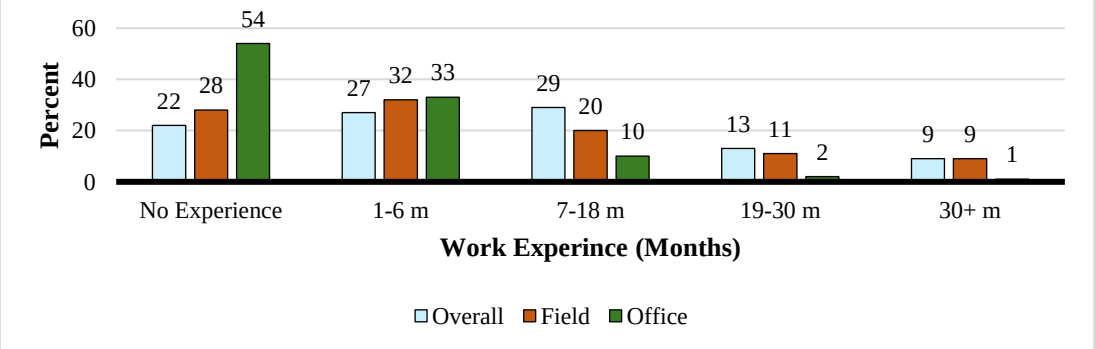

Figure 4. Construction work experience in month (%)

Students were asked to report their current GPA, and the responses revealed a broad range of academic performance. Only small percentages of students (5% combined) reported a GPA below 2.6. The most common category was a GPA between 3.00 and 3.19, chosen by 22% of students. GPAs from 2.80 to 2.99, 3.20 to 3.39, 3.40 to 3.59, and 3.60 to 3.79 all represented similar shares, each ranging from 12% to 19%. Notably, 13% of students have a GPA in the highest category, 3.80 to 4.00. Overall, the cohort is academically diverse, with most students clustered in the moderate to high GPA ranges and only a few at lower academic levels (Table 3).

Table 3. Reported GPA (%)

	GPA									
Level	**2.19 or lower**	**2.20-2.39**	**2.40-2.59**	**2.60-2.79**	**2.8-2.99**	**3.00-3.19**	**3.20-3.39**	**3.40-3.59**	**3.60-3.79**	**3.80-4.00**
Percent	2	1	2	4	12	22	12	19	13	13

Participants were asked the open-ended question, "Please list (in order of preference), three things you hope to gain from joining the Competition Team." Analysis of their responses reveals several prominent themes. Most frequently, students expressed a desire to gain construction-related knowledge, hands-on experience, and expanded professional or social connections. Many also mentioned hoping to develop teamwork, leadership, and communication skills, as well as build their resumes and network with industry professionals. Other common aspirations included enjoying the experience, making memories, and improving real-world problem-solving and presentation abilities. While a minority reported uncertainty or no interest, the overall findings highlight students' strong preference for meaningful learning, career development, and personal growth through participation in the competition team. There is considerable consistency in the recurring themes across first, second, and third order preferences, with students most commonly mentioning knowledge, experience, and networking in all three positions. However, first-order responses more frequently emphasized gaining construction knowledge and hands-on experience as top priorities. Second and third order preferences more often included soft skills such as teamwork, leadership, and communication abilities, along with aspirations for making industry connections and enjoying the competition experience. While the core themes remain the same, there is a subtle shift from practical knowledge and experience in the first position to skill development, personal growth, and enjoyment in later preferences, reflecting a broader range of student motivations as secondary and tertiary goals are considered.

Inferential Analysis

A Spearman correlation test was conducted to assess whether there is a relationship between students' GPA and their interest in participating in the ABC and ASC construction competitions. Spearman's rank-order correlation is generally used to assess the strength and direction of a monotonic relationship between two variables when the data are ordinal. The results show a correlation coefficient of -0.001 between GPA and ASC interest ($p = 0.993$) and a coefficient of -0.078 between GPA and ABC interest ($p = 0.268$), both of which are very close to zero and not statistically significant. This indicates there is no meaningful correlation between students' academic performance (GPA) and their interest in either the ASC or ABC competitions. However, there was a strong and statistically significant correlation ($r = 0.860$, $p < 0.001$) between interest levels in the ASC and ABC

competitions themselves, suggesting that students interested in one competition tend to also be interested in the other. Overall, these results imply that academic performance does not influence students' enthusiasm for participation in the major construction competitions, but that interest in the two events is closely linked.

A Spearman correlation test was also conducted to examine the relationship between students' interest in participating in the ABC and ASC competitions and their levels of construction work experience, overall, in the field, and at the office. The resulting correlation coefficients were all small and negative: overall experience (-0.105 for ASC, -0.109 for ABC), field experience (-0.067 for ASC, -0.080 for ABC), and office experience (-0.092 for ASC, -0.059 for ABC). None of these relationships was statistically significant (all p-values well above .05), which means there is no meaningful association between the extent of a student's work experience and their interest in participating in major construction competitions. These findings suggest that regardless of how much professional experience students have in the construction field or office, they are equally likely to express interest, or lack thereof, in joining the ABC and ASC competition teams.

Finally, another Spearman correlation test was conducted to examine whether students' perceived usefulness of competitions is related to their interest in joining the ABC and ASC competition teams. The results show a statistically significant positive relationship between perceived usefulness and interest in both competitions: $r = 0.311$, $p < 0.001$ for ABC and $r=0.219$, $p=0.001$ for ASC. This indicates that students who view competitions as more useful tend to show greater interest in participating. Overall, these findings suggest that enhancing students' understanding of the educational and professional benefits of such competitions may positively influence their motivation to participate.

Discussion

Most students showed limited familiarity with construction-related competitions but recognized their potential benefits for learning and professional development. The majority rated competitions as moderately or highly useful for knowledge acquisition, networking, and teamwork, yet expressed only moderate interest in joining ABC or ASC competition teams. Correlation analysis revealed no significant relationship between GPA or work experience and competition interest, indicating that academic standing and professional exposure do not influence students' enthusiasm. Instead, students who perceived competitions as useful were significantly more likely to express interest in participating. Moreover, interest in ABC and ASC competitions was strongly correlated, suggesting they attract similar student profiles. With this, the low familiarity yet generally positive attitudes suggest a structural awareness problem rather than a negative perception of competitions themselves. This limited familiarity may stem from competitions being positioned as optional, faculty-dependent activities rather than embedded, recurring components of the curriculum, which aligns with prior work noting that institutional visibility and support strongly shape participation levels in CBL initiatives. In practical terms, construction programs could respond by systematically introducing ASC/ABC competitions in early coursework, explicitly mapping competition tasks to course learning outcomes, and showcasing past teams through class visits, guest panels, and targeted advising.

The findings clearly indicate that students' perceptions of competition usefulness are the dominant factor shaping their motivation. This underscores the crucial role of construction educators in influencing engagement: by promoting competitions, integrating them into coursework, and demonstrating their real-world relevance, educators can substantially increase student interest. Compared with earlier studies that primarily documented benefits for those who already participate, these results extend the conversation upstream by highlighting how perceived usefulness functions as

a gatekeeper for initial engagement, while GPA and work experience appear largely irrelevant. This contrast suggests that future competition-focused research and practice should shift attention from "which students succeed in competitions" to "how programs frame and communicate competitions so that more students are willing to participate in the first place. Ultimately, awareness and perceived value, not academic achievement or prior experience, serve as the key catalysts for motivating student participation in construction competitions.

Conclusion

This study examined the motivational factors influencing construction students' participation in national competitions such as the ASC and ABC events. Findings indicate that while students generally recognize the educational and professional value of these competitions, actual participation remains limited due to time constraints, limited awareness, and competing academic priorities. The analysis showed that perceived usefulness is the strongest predictor of interest, whereas GPA and prior work experience have little or no effect on motivation to engage. These results affirm that student motivation in competition-based learning depends primarily on how clearly students understand the relevance of competitions to their professional and academic development. To increase participation, construction programs should integrate competition elements within coursework, establish faculty mentorship structures, and provide institutional recognition or credit for involvement. Such strategies reinforce the value of experiential learning and normalize participation as part of the curriculum rather than an extracurricular option.

This study has several important limitations that should be considered when interpreting the findings. The data were collected from a single U.S. land-grant university, located in one geographic region, which limits the generalizability of the results to other institutional types, regions, or international contexts. The cross-sectional survey design captures students' perceptions and interests at one point in time rather than tracking how familiarity, motivation, and participation evolve as they progress through the curriculum. In addition, all measures were self-reported, which introduces potential social desirability and recall bias and does not directly capture actual participation, performance, or long-term outcomes related to competitions. At the same time, the findings offer several actionable implications for ASC-related programs. Construction faculty could operationalize the importance of perceived usefulness by embedding competition-style problems, case studies, or mini-charrettes into required courses, explicitly labeling these as aligned with ASC/ABC tasks and outcomes. Programs might also adopt structured advising practices, such as introducing competitions during first-year orientations, including competition information in degree checklists, and scheduling targeted information sessions before team selection cycles. Departments could increase visibility and perceived value by formally recognizing participation through course credit, micro-credentials, or transcript notations, and by inviting former competitors and industry partners to share how competitions contributed to internships, employment, and career advancement. Together, these strategies translate the study's insights into concrete steps that construction educators can take to increase awareness, strengthen perceived usefulness, and normalize competition participation as an integral component of construction education.

Future studies should extend this work across multiple institutions and track long-term outcomes such as leadership development, career placement, and sustained professional engagement. Strengthening the integration of competition-based learning can enhance student motivation, skill acquisition, and overall readiness for the construction industry.

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