# Curriculum Reform in Quantity Surveying: Learner Insights for Enhancing Graduate Readiness in the Built Environment of Developing Countries

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**Abstract:** This study examined the alignment of quantity surveying (QS) education with the evolving demands of the construction industry, particularly in developing countries. This study highlighted students' perceptions of curriculum strengths, digital tool exposure and teaching quality of QS education programme structure, while identifying critical deficiencies in sustainability, communication, global readiness, and interdisciplinary collaboration in the education programme. A structured quantitative survey of 125 QS undergraduates from a leading and reputable private higher education institution in Malaysia was conducted to evaluate perceptions of educational adequacy across technical and human-centred competencies essential for the built environment. The originality of this study lies in its vertically integrated analysis across four academic levels, offering empirical insights seldom addressed in the literature. The findings present practical implications for higher education institutions, industry stakeholders, and policymakers by advocating a more integrated, forward-looking curriculum that promotes stronger academic-industry collaboration. Although the study was limited to a single institution, the results yield transferable insights for QS curriculum reform in comparable educational and developmental contexts. By foregrounding the student voice, this research contributes to ongoing discourse on educational innovation, sustainable capacity building, and the future of QS training within the architecture, engineering and construction industry in developing economies.

**Keywords:** Quantity surveying, Higher education, Curriculum reform, Industry-academia alignment, Developing countries

## INTRODUCTION

The construction industry is a fundamental component of the global economy. The industry drives infrastructure development and generates substantial employment opportunities. The demand for skilled professionals, especially quantity surveyors, remains strong due to their critical role in managing the financial, contractual and administrative aspects of construction projects. In Commonwealth countries, including Malaysia, the quantity surveying (QS)

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profession adheres to United Kingdom-based standards to ensure professional competence and consistency (Dada and Jagboro, 2012; Yap, Hew and Skitmore, 2022). Understanding the evolving skills and context-specific competencies of QS is essential, as their traditional roles are being reshaped by emerging industry demands, client expectations and global variations in service scope. According to Moyo et al. (2023), the process requires continuous professional development to ensure effective and efficient project delivery.

QS responsibilities have expanded due to advancements in digital technology and increasing project complexity, prompting a need for continuous updates to QS programmes in higher education institutions. Higher education institutions play a crucial role in preparing future QS professionals by equipping them with the skills, competencies and values to thrive in a rapidly evolving industry. However, most existing literature prioritises industry professionals' views on employer expectations. Research focusing on strategies to enhance QS education, particularly from the perspective of undergraduate students, who are the future workforce, remains limited (Kibwami et al., 2021; Yap, Hew and Skitmore, 2022).

According to Pham and Starkey (2016) in Vietnam and Groen (2021) in Canada, student perceptions are a vital tool for assessing and enhancing the quality of higher education. By understanding students' perspectives, gaps between academic preparation and industry needs are identified. Moreover, student evaluations offer valuable insights into their learning experiences, enabling higher education institutions to identify areas for improvement and adapt their programmes to meet the changing demands of the profession (Ebekozien and Aigbavboa, 2021; Yap et al., 2022). In short, understanding students' perspectives ensures curricula remain relevant and responsive and integrates both industry and student views that enable QS education to better align with the evolving demands of the construction industry.

This study evaluated the effectiveness of QS education in Malaysia, focusing on how well it equipped QS students with the necessary skills for the profession. By analysing student perceptions, the study provides actionable insights for higher education institutions to improve curriculum design, teaching methods and academic policies, ensuring alignment with industry standards and future professionals' needs. The key research questions addressed were:

1. What is the current state of QS education in Malaysia?
2. How can QS education be improved to meet the evolving demands of the construction industry?

## LITERATURE REVIEW

### Attributes of the Current State of Quantity Surveying Education

### Alignment of quantity surveying education with industry needs in Malaysia

The effectiveness of QS education in Malaysia hinges on its relevance to industry requirements. Undergraduate QS programmes provide a foundation in construction materials, technologies, and essential digital tools such as building information modelling (BIM) (Becerik-Gerber, Ku and Jazizadeh, 2012) and computer-aided quantity surveying software (Ekundayo et al., 2011). Practical application is emphasised and real-world placements enhance employability, helping graduates meet current and future demands (Thayaparan et al., 2011). For example, BIM is a valuable curricular component (Olatunji et al., 2021) as it complements traditional practices (Tehami and Seddiki, 2023). Mastering these technology competencies reflects the growing importance of digital technologies.

### Curriculum and practical training in quantity surveying education

A QS degree education is a three- to four-year programme that combines theoretical knowledge with practical training. The programme begins with core knowledge in construction and surveying, progressing to cost estimation and project management. The third-year internship allows students to apply theory in real contexts (Ekundayo et al., 2011) and final-year projects and research prepare them for professional practice (Alwee et al., 2011). In general, outcome-based education methods with clear course outcomes and programme educational objectives support technical and soft skills development (Arshad, Razali and Mohamed, 2012). The methods build communication, teamwork and problem-solving skills through approaches such as cooperative learning, group projects and real-life scenarios (Perera et al., 2017; Kibwami et al., 2021).

### Digital technologies in quantity surveying education

Digital tools like BIM, information technology and augmented reality (Babatunde and Ekundayo, 2019; Ebekozien and Aigbavboa, 2023; Tehami and Seddiki, 2023) are increasingly integrated in QS education. In addition, the adoption of Construction 4.0 concepts prepares students for a digital future (Ginigaddara, Gajendran and Beard, 2023) that keeps them relevant to the future job market. Also, QS curricula must continuously evolve to enhance digital literacy and include research-driven learning (Haddade et al., 2024).

## Role of accreditation and professional development

Programme accreditation ensures quality and industry relevance. In Malaysia, accreditations by the Board of Quantity Surveyors Malaysia (BQSM) and the Royal Institution of Chartered Surveyors (RICS) signal adherence to standards (Leathem, 2020). RICS partnerships align QS programmes with international benchmarks (RICS, 2024), while continuous professional development (CPD) supports graduate adaptability amid industry changes (Iqbal, Taib and Razalli, 2024; Kumar et al., 2024).

## Summary

QS education in Malaysia combines theoretical foundations with practical application. Digital tools and soft skills development ensure graduates meet evolving industry needs. Accreditation by bodies like BQSM and RICS upholds international standards. As industry demands shift, ongoing curriculum updates, industry partnerships and student feedback are essential for continuous improvement and student satisfaction.

# Strategies to Improve Quantity Surveying Education

## Addressing the skills mismatch

Despite existing strengths, QS education in Malaysia faces challenges in ensuring that QS education graduates possess a balanced mix of technical and soft skills. However, while many students are technically competent, deficiencies persist in communication, teamwork and problem-solving skills highly valued by employers (Department of Statistics Malaysia, 2022). The growing gap between academic training and industry expectations highlights the need for ongoing curriculum refinement. Higher education institutions must strengthen both technical instruction and interpersonal skills, including presentation and adaptability, to better prepare QS students.

## Curriculum relevance and industry collaboration

QS programmes must adapt to the rapid changes in construction technologies and project management practices. Collaboration with industry professionals is essential to maintain curriculum relevance. Regular consultations with employers and practitioners enable the integration of emerging skills and technologies such as BIM and sustainable practices, while also facilitating valuable networking opportunities (Pikas, Sacks and Hazzan, 2013; Zakariya, 2017). Accordingly, Wong, Wong and Hui (2007) emphasise the importance of periodic programme reviews to ensure alignment with industry needs.

## Digitalisation and Industry 4.0 technologies

The rise of Industry 4.0 requires QS education to embed digitalisation into both theory and practice. However, technology integration must be effective, not superficial (Balogun, 2024). Maina (2018) highlights that digital courses and tutorials significantly enhance education quality, while Ojo and Ogunsemi (2022) emphasise the need for curriculum modernisation to meet market demands. For example, higher education institutions should provide hands-on training on digital tools to develop applied competencies. Yap, Hew and Skitmore (2022) and Ebekozien and Aigbavboa (2023) also stress the need for comprehensive digital education and support for learners. Thus, embedding digitalisation as a core learning component ensures students gain both conceptual understanding and practical proficiency (Manzo, Iv and Bruno, 2018).

## Enhancing practical skills and work experience

Blending theoretical knowledge with real-life application is critical for developing digital fluency. Manzo, Iv and Bruno (2018) recommend embedding practical training within the curriculum. higher education institutions should facilitate internships, case studies and site visits, providing students with real-world exposure (Wong, Wong and Hui, 2007; Peterson et al., 2011). Such experiences bridge the gap between academic learning and professional practice and enhance graduate employability.

## Continuing professional development

CPD supports ongoing growth in skills, knowledge and professional confidence. BQSM-regulated CPD programmes cater to various career stages and participation enhances job performance, industry credibility and advancement opportunities (Roscoe, 2002; Ravindran and Kalpana, 2012).

## Interdisciplinary education and industry involvement

Incorporating transformative learning and cross-disciplinary collaboration can strengthen student readiness for the built environment (Iyer-Raniga and Andamon, 2016). To illustrate, interdisciplinary learning prepares students for complex industry challenges by integrating diverse knowledge areas (Schijf, Van der Werf and Jansen 2023). This contrasts with traditional, siloed approaches (Spelt et al., 2009). Industry collaboration also supports curriculum funding, real-world insights and relevance (Hasan, Ahamad and Mohamed, 2011; Jablon-Roberts and McCracken, 2022; Yap, Hew and Skitmore, 2022).

## Critical thinking and problem-solving

To foster analytical skills, QS programmes should use real-world case studies, presentation-based learning and interactive classroom discussions. Assignments involving clients and consultants provide authentic practice in communication and negotiation (Shafie, Khuzzan and Mohyin, 2014). Leung, Dongyu and Liu (2014) advocate holistic personal development to complement technical education.

## Research and development in quantity surveying education

Research and development approach ensures that QS education is aligned with technological and industry advances. Research-led education supports the integration of Construction 4.0 and enhances student exposure to emerging digital tools (Ginigaddara, Gajendran and Beard, 2023; Maisano, Mastrogiacomo and Franceschini, 2023). As a result, faculty members should update their knowledge and embed cutting-edge research into teaching practices (Francis et al., 2015).

## Internationalisation and global perspectives

Incorporating international construction practices and legal frameworks builds global industry awareness. Wong, Wong and Hui (2007) suggest that insights into foreign markets, such as China, enrich graduate competencies. Study tours and placements abroad further develop global readiness (Luna, Chong and Djurica, 2023).

## The role of feedback in learning

Effective feedback fosters self-directed learning, helping students track progress and informing educators of learning gaps (Ferguson, 2011). Clear and relevant feedback contributes to better academic performance and learner engagement (Al-Bashir, Kabir and Rahman, 2016).

## Summary

Strategies to improve QS education in Malaysia address key challenges such as skill mismatches, curriculum relevance and digitalisation (as shown in Table 1). Recommended actions include strengthening practical training, incorporating interdisciplinary education and promoting CPD. Embedding global perspectives and ensuring regular feedback also contribute to producing well-rounded graduates who can succeed in an evolving industry.

**Table 1.** Literature map for strategies to improve QS education

| Ref. | Strategies | Source | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Alwee et al. (2011) | Shafie, Khuzzan and Mohyin (2014) | Shafiei and Said (2008) | Manzo, Iv and Bruno (2018) | Ojo and Ogunsemi (2022) | Yap, Hew and Skitmore (2022) | Peterson et al., (2011) | Ayarkwa et al. (2011) | Ravindran et al. (2023) | Schijf, Van der Werf and Jansen (2023) | Spelt et al. (2009) | Iyer-Raniga and Andamon (2016) | Hasan, Ahamad and Mohamed (2011) | Jablon-Roberts and McCracken (2022) | Jablon-Roberts and McCracken (2023) | Sani (2019) | Luna, Chong and Djurica (2023) | Ferguson (2011) | Al-Bashir, Kabir and Rahman (2016) | Giniğaddara, Gajendran and Beard (2023) | Wong, Wong and Hui (2007) | Roscoe (2002) | Total |
| S1 | Practical learning and experiences | | | | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | | | ✓ | | 5 |
| S2 | Updated and industry relevant curriculum | ✓ | ✓ | ✓ | | | | | | | | | | | | | | | | | | ✓ | | 4 |
| S3 | Industry engagement and guest lectures | | | | | | | | | | | | | ✓ | ✓ | ✓ | | | | | | ✓ | | 4 |
| S4 | Technology integration | | | | ✓ | ✓ | ✓ | | | | | | | | | | | | | | | | | 3 |
| S5 | Interdisciplinary approach | | | | | | | | | | ✓ | ✓ | ✓ | | | | | | | | | | | 3 |
| S6 | Performance assessment and feedback | | | | | | | | | | | | | | | | | | ✓ | ✓ | | | | 2 |
| S7 | Research and innovation | | | | | | | | | | | | | | | | ✓ | | | | ✓ | | | 2 |
| S8 | International exposure | | | | | | | | | | | | | | | | | ✓ | | | | ✓ | | 2 |
| S9 | Professional development and certification | | | | | | | | | ✓ | | | | | | | | | | | | | ✓ | 2 |
| S10 | Soft skills training | | ✓ | | | | | | | | | | | | | | | | | | | | | 1 |

## METHODOLOGY

A deductive, pragmatic approach was employed, using an online questionnaire to collect feedback from undergraduate students enrolled in a four-year Bachelor of Quantity Surveying (Honours) programme at a private Malaysian university. Students were the sole focus, as direct beneficiaries of educational strategies and best placed to comment on curriculum delivery. The study's pragmatic orientation reflected its aim to address real-world curriculum gaps based on student experiences. Ethical protocols were followed and data were analysed using descriptive and inferential statistics.

### Questionnaire Design

A comprehensive literature review and interviews with academics and students were conducted to identify relevant variables. The questionnaire was crafted using clear and straightforward language to ensure respondents could provide informed judgements. It covered eight attributes of current QS education and ten strategies for improvement. The questionnaire was divided into three sections. Part 1 gathers demographic information from respondents, Part 2 uses a five-point Likert scale to evaluate opinions on eight attributes and Part 3 assesses 10 strategies using a scale ranging from 1 (Not Relevant) to 5 (Extremely Relevant). The questionnaire was designed to be completed within 15 min to reduce respondent fatigue and maintain data quality.

### Data Collection

The survey employed non-probability convenience and snowball sampling methods with stratification to select respondents. A pilot study involving 30 respondents assessed the questionnaire's design and clarity. The Cronbach's alpha values for the eight attributes and 10 strategies exceeded 0.87, demonstrating strong internal consistency reliability. As the questionnaire remained unaltered, all 30 pilot responses were retained in the main survey. Ethical clearance was obtained from the Ethics Review Board, ensuring adherence to ethical guidelines for studies involving human respondents. Informed consent was obtained from all respondents before participation, with assurances of confidentiality, voluntary participation and the right to withdraw at any time. A total of 330 students were engaged, yielding 125 valid responses, resulting in a response rate of 37.88%. This sample size met the central limit theorem criteria, ensuring the reliability of statistical analyses.

## SURVEY RESULTS AND ANALYSIS

### Academic Profile of Respondents

Table 2 shows a balanced representation of respondents' academic backgrounds, with 32 respondents from Year 1, 31 from Year 2, 30 from Year 3 and 32 from Year 4. Approximately 60% of the respondents were female, which was similar to the gender percentage in private universities' Bachelor of Quantity Surveying programmes. Most students achieved a cumulative grade point average (CGPA) between 3.0000 and 3.6699.

**Table 2.** Respondents' demographic profile

| Demographic Information | Categories | Respondents Group | | | | Total | Frequency (%) |
|---|---|---|---|---|---|---|---|
| | | Year 1 | Year 2 | Year 3 | Year 4 | | |
| Gender | Male | 16 | 5 | 11 | 14 | 46 | 36.80 |
| | Female | 16 | 26 | 19 | 18 | 79 | 63.20 |
| Year of study | Year 1 | 32 | – | – | – | 32 | 25.60 |
| | Year 2 | – | 31 | – | – | 31 | 24.80 |
| | Year 3 | – | – | 30 | – | 30 | 24.00 |
| | Year 4 | – | – | – | 32 | 32 | 25.60 |
| Current CGPA | 2.0000 to 2.9999 | 2 | 6 | 5 | 8 | 21 | 16.80 |
| | 3.0000 to 3.6699 | 27 | 21 | 19 | 20 | 87 | 69.60 |
| | 3.6700 to 4.0000 | 3 | 4 | 6 | 4 | 17 | 13.60 |

### Perceived Current State of Quantity Surveying Education

The eight surveyed attributes had good reliability with a Cronbach's alpha score of 0.841. Table 3 shows the mean scores for the eight attributes perceived by 125 respondents, ranging from Year 1 to Year 4 QS students.

**Table 3.** Mean scores for the attributes perceived

| No. | Attributes | Measurement Scale | Year of Study | | | | Overall (*N* = 125) |
|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | |
| 1 | QS programme structure | Adequacy | 3.469 | 3.484 | 3.700 | 3.438 | 3.520 |
| 2 | Learning resources | Adequacy | 3.469 | 3.484 | 3.433 | 3.188 | 3.392 |
| 3 | Teaching methods | Efficacy | 3.469 | 3.516 | 3.733 | 3.469 | 3.544 |
| 4 | BIM implementation into programme curricula | Efficacy | 3.531 | 3.323 | 3.600 | 3.281 | 3.432 |

(*Continued on next page*)

**Table 3.** *Continued*

| No. | Attributes | Measurement Scale | Year of Study | | | | Overall (*N* = 125) |
|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | |
| 5 | Programme accreditation status | Awareness | 3.344 | 3.387 | 3.533 | 3.406 | 3.416 |
| 6 | Employment outcome | Quality | 3.406 | 3.487 | 3.500 | 3.594 | 3.496 |
| 7 | QS curriculum to industry needs | Satisfaction | 3.531 | 3.484 | 3.600 | 3.625 | 3.560 |
| 8 | Overall satisfaction with QS education | Satisfaction | 3.594 | 3.516 | 3.600 | 3.719 | 3.608 |

Most respondents (52.00%) were satisfied with their education process, noting the programme alignment with industry needs. Year 3 and Year 4 students, especially those who had completed industrial training, reported high satisfaction. This indicated that the curriculum effectively prepared QS students for real-world challenges. Also, the study found that though the current QS programme structure effectively developed students' technical skills for their careers, it often overlooked personal competencies vital for work performance and personal growth. Bridging this gap was critical to better align academic preparation with industry demands.

Regarding the adequacy of learning resources, 52.80% of the respondents found the resources sufficient, 49.60% rated them as adequate and 3.20% rated them as extremely adequate. However, 16.80% of Year 4 students considered them insufficient, likely due to differing learning preferences, backgrounds and career goals. In terms of the efficacy of teaching methods, 47.20% of respondents found the teaching methods effective, with Year 3 students showing the highest approval. Meanwhile, 7.20% rated the methods very effective, and 15 Year 1 students remained neutral. Perceptions likely vary due to the complexity of the course content and the level of engagement. A majority of respondents (51.20%) viewed the implementation of BIM positively, 28.80% were neutral and 15.20% rated it poorly. In general, Year 3 and Year 5 QS students who had completed industrial training highly rated the BIM implementation rate, indicating its value in their practical experiences.

Moreover, 44% of respondents, mostly Year 1 QS students, were moderately aware of their HEI's accreditation status. Year 2 students showed greater awareness, with 14 respondents expressing high awareness, likely due to their academic progression. In contrast, Year 3 and Year 4 QS students did not prioritise accreditation unless it affected their studies or career plans. Nonetheless, most respondents across all year groups were optimistic about QS employment outcomes, with 32% students having a neutral response. The profession's stability and strong job prospects contribute to this positive outlook among QS students. In general, most respondents (57.60%) were satisfied with the QS education, while 31.20% were neutral and 6.40%

were dissatisfied. The positive responses reflected the programme's strong curriculum, effective teaching, experienced faculty, practical training and relevant content.

## Strategies to Improve Quantity Surveying Education

The Cronbach's coefficient alpha score for the 10 evaluated strategies was 0.897, indicating good internal consistency reliability. Table 4 shows the ranking, mean score and standard deviation (SD) of the significance ratings for each strategy. The mean scores that ranged from 3.768 to 4.320 contained five strategies: "Technological integration" (S4), "Updated and industry-relevant curriculum" (S2), "Practical learning and experiences" (S1), "Performance assessment and feedback" (S6), and "International exposure" (S8).

"Integrating technology" (S4) was the most critical strategy for aligning QS education with the principles of digital construction and the Construction 4.0 framework. Modern QS practices require advanced technical solutions, such as BIM and digital product models, to enhance key functions including cost control, project management and collaboration (Matipa, Kelliher and Keane, 2008; Moyo et al., 2023). Respondents emphasised the need to incorporate technology-focused training to ensure students were equipped to meet the demands of current and future industry practices. Approximately 80% of respondents stressed the importance of adopting and utilising digital tools, including BIM, Microsoft Excel (Microsoft Corporation, Washington, United States) and Cubicost (Glodon Company Limited, Beijing, China), which are widely used for tasks such as quantity take-offs, billing and project costing. These tools have become indispensable as manual methods grow increasingly outdated and inefficient.

Furthermore, integrating technologies into QS curricula ensured QS students were familiar with their applications in the construction context and were consistent with the industry's shift towards automation, precision and data-driven decision-making (Chia, 2025). By incorporating digital construction tools and methodologies into QS education, higher education institutions can prepare students for evolving roles that leverage technology to optimise processes, improve collaboration and enhance project outcomes. This forward-looking approach ensures that graduates are industry-ready, capable of contributing to the ongoing digital transformation in construction and aligned with the future trajectory of Construction 4.0 (Ebekozien and Aigbavboa, 2023; Omrany et al., 2025). Integrating collaborative technology can also effectively support a hybrid learning environment by combining face-to-face instruction with asynchronous virtual learning (Hopkins, Lin and Nariswari, 2023). This integration enhances interaction and knowledge sharing while providing the flexibility needed to accommodate diverse student requirements, ensuring accessibility while preserving the advantages of in-person engagement.

**Table 4.** Mean and ranking of strategies to improve QS education training by undergraduates

| Ref. | Strategies | Overall (*N* = 125) | | | Year 1 (*N* = 32) | | | Year 2 (*N* = 31) | | | Year 3 (*N* = 30) | | | Year 4 (*N* = 32) | | | Kruskal-Wallis H | *p*-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | Rank | Mean | SD | Rank | Mean | SD | Rank | Mean | SD | Rank | Mean | SD | Rank | | |
| S4 | Technology integration | 4.320 | 0.714 | 1 | 4.406 | 0.798 | 1 | 4.194 | 0.654 | 5 | 4.167 | 0.791 | 2 | 4.500 | 0.568 | 2 | 4.994 | 0.172 |
| S2 | Updated and industry-relevant curriculum | 4.256 | 0.728 | 2 | 4.094 | 0.641 | 2 | 4.516 | 0.626 | 1 | 4.100 | 0.845 | 3 | 4.313 | 0.738 | 3 | 7.729 | 0.052 |
| S1 | Practical learning and experiences | 4.232 | 0.824 | 3 | 3.844 | 0.920 | 6 | 4.323 | 0.653 | 3 | 4.233 | 0.898 | 1 | 4.531 | 0.671 | 1 | 10.377 | 0.016* |
| S6 | Performance assessment and feedback | 4.056 | 0.910 | 4 | 3.969 | 0.861 | 4 | 4.258 | 0.999 | 4 | 3.900 | 0.923 | 6 | 4.094 | 0.856 | 4 | 4.184 | 0.242 |
| S8 | International exposure | 4.056 | 0.918 | 5 | 4.000 | 0.803 | 3 | 4.419 | 0.807 | 2 | 3.867 | 0.900 | 8 | 3.938 | 1.076 | 7 | 7.871 | 0.049* |
| S5 | Interdisciplinary approach | 3.976 | 0.902 | 6 | 3.781 | 0.832 | 8 | 4.161 | 1.003 | 6 | 3.933 | 0.828 | 5 | 4.031 | 0.933 | 6 | 4.634 | 0.201 |
| S9 | Professional development and certification | 3.960 | 0.911 | 7 | 3.656 | 0.865 | 10 | 4.161 | 1.036 | 7 | 3.967 | 0.718 | 4 | 4.063 | 0.948 | 5 | 7.053 | 0.070 |
| S10 | Soft skills training | 3.936 | 0.887 | 8 | 3.938 | 0.801 | 5 | 4.065 | 0.629 | 9 | 3.900 | 0.960 | 7 | 3.844 | 1.110 | 8 | 0.380 | 0.944 |
| S3 | Industry engagement and guest lectures | 3.872 | 0.740 | 9 | 3.844 | 0.628 | 7 | 3.935 | 0.512 | 10 | 3.867 | 0.900 | 8 | 3.844 | 0.884 | 9 | 0.240 | 0.971 |
| S7 | Research and innovation | 3.768 | 0.943 | 10 | 3.750 | 0.803 | 9 | 4.129 | 0.619 | 8 | 3.600 | 1.037 | 10 | 3.594 | 1.160 | 10 | 6.170 | 0.104 |

*Note*: *The mean difference is significant at the 0.05 level.

"Updated and industry-relevant curriculum" (S2) ranked second. It highlighted the pressing need for higher education institutions to align their programmes with industry standards. Arowoiya, Akinradewo and Oke (2022) believe that this alignment is particularly critical in specialised fields such as mechanical and electrical services. The success of surveying programmes hinges on the practicality and relevance of the knowledge imparted, encompassing everything from course design to assessment methods. Collaboration between higher education institutions and industry professionals is vital to achieving this alignment. Tokijan and Aziz (2023) advocate for partnerships between academia and experienced quantity surveyors, which can help ensure that course content addresses current industry needs while integrating real-world insights. Such collaboration enriches the curriculum, bridging the gap between theoretical knowledge and practical application. Similarly, Mohajerzad and Diekmann (2024) highlight evidence-based education and encourage a dynamic connection between research and practice, where real-world challenges inform academic programs. Additionally, alumni feedback plays a pivotal role in shaping curriculum improvements. QS alumni suggested that foundational knowledge be prioritised in the early years of study, while advanced technical skills be developed later. This phased approach ensured students build a robust base before specialising in specific areas, aligning with Wong, Wong and Hui (2007), who argue that domain-specific expertise is essential for professional success.

"Practical learning and experiences" (S1) ranked third. Structured reflective practice produces enhanced learning that spans multiple dimensions (Gibson et al., 2011). Academically, Arowoiya, Akinradewo and Oke (2022) emphasise the importance of practical experience in mechanical and electrical services, linking effective learning to hands-on involvement in mechanical and electrical activities on-site. Similarly, Kibwami et al. (2021) confirm that continuous exposure to field activities throughout the educational programme significantly enhances professional knowledge and skills. Ongoing practical engagement bridges the gap between academic learning and real-world applications. Asonitou (2015) highlights the value of internships in connecting theoretical knowledge with practical industry requirements, enabling students to apply academic concepts in real-world scenarios (Lian, Foo and Ling, 2018). However, the success of such programmes also depends on the organisers' operational and administrative efforts and the role played by host companies (Renganathan, Karim and Li, 2012). Beyond internships, Wong, Wong and Hui (2007) advocate involving industry professionals in seminars and forums to provide students with current insights and practical understanding. Together, these approaches offer a comprehensive framework, spanning structured reflective practices, internships, on-site exposure and industry engagement, to enrich student learning experiences and prepare them to meet industry challenges effectively.

Ranked fourth was "Performance assessment and feedback" (S6). The strategy was pivotal in aligning QS education with industry demands. Wong, Wong and Hui (2007) emphasise that effective communication between higher education institutions and industry practitioners is critical for maintaining curriculum relevance in the ever-evolving construction sector. Regular professional feedback ensures that QS programmes remain attuned to market needs, enabling students to acquire the skills necessary to meet current and emerging industry challenges. Periodic curriculum reviews in collaboration with employers and experienced surveyors are crucial for identifying new skill requirements, such as proficiency in digital tools or sustainability practices and for addressing gaps in existing training (Tan et al., 2017; Ebekozien and Aigbavboa, 2023). Moreover, regular performance assessments help gauge students' readiness for professional roles and provide opportunities for constructive feedback that can refine their learning trajectories. Integrating industry insights through structured feedback encourages a dynamic and responsive educational framework. This approach equips students with the technical, interpersonal and adaptive skills to thrive in a competitive and fast-changing business environment. Fostering a culture of continuous improvement, performance assessment and feedback is an important pillar for producing industry-ready graduates who can excel in real-world construction settings.

"International exposure" (S8) ranked fifth for improving QS education, reflecting the construction industry's increasing globalisation and the need for professionals to operate effectively in international markets. Wong, Wong and Hui (2007) highlight that professionals in Hong Kong excelled in international transactions by leveraging their strategic geographic position and extensive experience in global markets. However, the demands of the modern construction landscape have evolved. QS professionals need to develop advanced proficiency with international standards, global best practices and region-specific knowledge, such as understanding the Chinese market. To prepare QS graduates for the complexities of global construction practices, QS education needs to integrate international perspectives through initiatives such as study visits, international internships and exchange programmes. Placements in dynamic markets as Mainland China or collaboration with global firms expose students to large-scale projects, diverse delivery methods and regulatory frameworks, enhancing both technical expertise and cultural adaptability. Beyond technical training, modules on global standards, such as those from the International Federation of Surveyors and RICS, along with case studies of international projects, equip students with cross-cultural communication skills and the ability to manage global projects. Partnerships between higher education institutions, industry stakeholders and professional bodies can further enrich learning through guest lectures, joint research and virtual exchanges, ensuring graduates are well-prepared for international professional interactions and the demands of a globalised industry.

## Differences in Perceptions between Student Groups

According to the Kruskal-Wallis test, the study found significant differences in perceptions regarding two strategies: "Practical learning and experiences" (S1) and "International exposure" (S8), among four respondent groups. Meanwhile, the Mann-Whitney test identified specific years with significant differences, as shown in Table 5.

**Table 5.** Mann-Whitney test on strategies to improve QS education training

| Year of Study | Asymptotic Significance (2-Tailed) | |
|---|---|---|
| | Practical Learning and Experiences | International Exposure |
| Year 1<br>Year 2 | 0.048* | 0.031* |
| Year 1<br>Year 3 | 0.066 | 0.655 |
| Year 1<br>Year 4 | 0.001** | 0.888 |
| Year 2<br>Year 3 | 0.903 | 0.010* |
| Year 2<br>Year 4 | 0.238 | 0.044* |
| Year 3<br>Year 4 | 0.196 | 0.558 |

*Notes*: *The mean is significant at the 0.05 level; **The mean is significant at the 0.01 level of significance.

Year 1 and Year 2 QS students had differing perspectives on learning strategies, reflecting their stages of academic development. Year 1 students were primarily concerned with foundational concepts, whereas Year 2 students emphasised experiential learning and global exposure. Variations in the perceived importance of practical learning were noted between Year 1 and Year 4 students and differences in the value placed on international exposure were observed between Years 2 and 3 students.

Junior and senior students had divergent views on practical learning due to the internship program's structure. Internships were available to Year 3 students who had completed over 50 credit hours. They served to bridge theoretical knowledge with industry practice. While juniors experienced limited real-world exposure through seminars and field trips, seniors benefited from hands-on experience during industrial training. This practical engagement identified gaps in the curriculum and provided valuable feedback for refining instruction and training.

The perspective of international exposure in QS education also varied between junior and senior students. As Malaysian construction firms expand into global markets, including ASEAN countries and beyond, senior students, particularly in Year 4, advocated for earlier exposure to international contexts. They emphasised that understanding the global construction industry is necessary for competitiveness in an increasingly globalised market.

## CONCLUSION

This study addressed a critical need to re-examine and enhance QS education in Malaysia, particularly within the context of private higher education institutions. While the role of QS continues to evolve owing to rapid advancements in technology, global market expansion and shifts in construction practices, there remains a notable gap in the literature concerning how students perceive the alignment between their education and industry expectations.

This study filled that gap by offering an in-depth, student-centred analysis based on the views of 125 QS undergraduates from a reputable private university recognised as one of the leading institutions in Malaysia. The findings revealed that, while students generally rated their QS education positively. They appreciated programme structure, digital tool exposure (e.g., BIM) and teaching effectiveness. This finding signalled a misalignment between academic training and professional readiness, particularly in the development of soft skills, global exposure, and hands-on technological competence.

The originality of this study lies in its systematic exploration of student perspectives across four academic levels, offering a vertically integrated view that is rarely addressed in the existing literature. Unlike previous studies that focus narrowly on curriculum content or institutional evaluations, this study captures detailed student experiences using statistically robust methods and demonstrates strong internal consistency of its instruments. Furthermore, by empirically ranking improvement strategies, it establishes a prioritised and evidence-based agenda for curriculum enhancement. These findings advance current understanding by identifying critical gaps in areas such as digital competence, practical learning, structured feedback and international exposure. Together, these insights are essential for aligning QS education with the evolving expectations of the construction industry.

Practically, this study offers clear, evidence-based recommendations for universities and curriculum developers. These include closer collaboration with industry, updating content to reflect emerging trends in digital construction and increasing student exposure to real project environments. From a theoretical perspective, this study contributes new insights to the relatively under-explored area of private university QS education in Malaysia

and Southeast Asia. In conclusion, this study not only identifies areas for improvement but also charts a path forward for aligning QS education with the evolving demands of the construction industry. It serves as a valuable reference for educators, policymakers and professional bodies committed to producing industry-ready QS graduates who are capable of contributing meaningfully to the built environment both locally and globally.

This study has several limitations. Firstly, the study relied on structured questionnaires. The structure may limit the depth and richness of responses compared with qualitative methods. Secondly, the sample was confined to students from a single institution. This institutional context may influence the findings, as private universities in Malaysia can differ from public institutions in several aspects, including curriculum design, teaching methodologies, access to resources and the extent of industry exposure. These differences may affect students' perceptions and learning experiences in QS education. Caution is therefore advised when attempting to generalise the results to other settings, particularly public universities or institutions with differing educational environments. In addition, the study did not incorporate the views of industry professionals. Although student feedback offered valuable insights into their academic experiences and expectations, future research should include perspectives from relevant industry stakeholders, such as employers and experienced practitioners. The inclusion of both academic and professional viewpoints would enable a more comprehensive understanding of educational needs and support the development of quantity surveying programmes that are more closely aligned with current industry requirements. Further research should also explore the role of digital tools such as BIM and artificial intelligence in reshaping quantity surveying education, while evaluating the continued importance of human skills such as negotiation, critical thinking and ethical judgement. Addressing these gaps will provide meaningful insights to enhance curriculum relevance and prepare graduates for the evolving construction industry landscape.

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