

Student Attendance and Academic Performance in a GenAI-Enabled Quantity Surveying Learning Environment

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Abstract

The increasing availability of Generative Artificial Intelligence (GenAI) tools is reshaping teaching, learning, and assessment practices in higher education. While GenAI offers opportunities to support independent learning and accessibility, concerns remain regarding student engagement, attendance, assessment authenticity, and competency development within applied disciplines. These concerns are particularly relevant in Quantity Surveying (QS) education, where measurement modules require students to develop technical competence, analytical reasoning, and professional judgement through guided practical activities.

This study investigates the relationship between student attendance and academic performance within a Level 4 QS Measurements module delivered at a UK higher education institution. A quantitative research approach was adopted using secondary data analysis of anonymised attendance records and assessment outcomes from 60 undergraduate students. Descriptive statistical analysis was conducted to examine patterns between attendance, coursework performance, and overall module achievement.

Findings suggest that students attending seven to ten sessions generally achieved higher average grades and pass rates than students attending fewer sessions. The analysis also identified variation between CW01 and CW02 performance, suggesting that different assessment components may evidence different aspects of students' technical understanding within technology-enabled learning environments.

This study contributes empirical evidence to the limited literature on attendance-performance relationships in QS education. The findings suggest that attendance remains an important component of academic performance in Quantity Surveying measurement education and highlight the need for authentic assessment approaches that support technical competency development in AI-enabled learning environments.

Keywords: Student Attendance; Academic Performance; Generative Artificial Intelligence (GenAI); Quantity Surveying Education; Measurement Education.

1 Introduction

The rapid advancement of Generative Artificial Intelligence (GenAI) technologies is transforming teaching, learning, and assessment practices across higher education (HE) (Timotheou *et al.*, 2023). Tools such as ChatGPT are increasingly used by students to support academic writing, problem-solving, information retrieval, and assessment preparation (Jose *et al.*, 2024). Recent studies suggest that GenAI is reshaping pedagogical practices and prompting universities to reconsider approaches to teaching, learning, and assessment design (Kasneci *et al.*, 2023; Clegg & Sarkar, 2024).

Within built environment education, the adoption of GenAI presents both opportunities and challenges (Adebayo *et al.*, 2025). The increasing digitalisation of the construction industry is transforming professional practice and competency expectations, requiring HE institutions to prepare graduates for technology-enabled working environments (Sawhney & Knight,

2023). Built environment education combines theoretical knowledge, technical competence, and professional skills development across a range of disciplines, including Quantity Surveying, Construction Management, Architecture, and Real Estate (Cotgrave & Alkhaddar, 2006; Sawhney & Knight, 2023). Consequently, universities must ensure that technological innovation enhances rather than replaces the development of these core competencies.

Student attendance has long been recognised as an important contributor to academic success within HE. Attendance facilitates engagement, interaction, guided learning, and timely feedback, all of which contribute to improved learning outcomes (Sanchez & Aleman, 2011). In technical disciplines such as Quantity Surveying, attendance may be particularly important because learning activities frequently involve practical demonstrations, drawing interpretation, quantity take-offs, and the application of New Rules of Measurement (NRM) principles (RICS, 2021; Qadir, 2023). These activities often require direct interaction with tutors and

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iterative problem-solving processes that can be difficult to replicate through independent study alone.

The growing availability of GenAI tools has raised questions regarding how technology-enabled learning environments may influence student engagement and learning behaviours (Rasul *et al.*, 2024). While AI-supported tools can enhance accessibility and independent learning opportunities, concerns remain regarding reduced classroom engagement, over-reliance on technology, and the maintenance of authentic competency development within professional disciplines (Cotton *et al.*, 2024; Adebayo *et al.*, 2025). However, empirical evidence examining attendance and academic performance within Quantity Surveying education remains limited, particularly in the context of increasingly AI-enabled learning environments.

Therefore, this study investigates the relationship between student attendance and academic performance within a Level 4 Quantity Surveying Measurements module delivered at a UK HE institution. By examining attendance patterns and assessment outcomes, the study seeks to contribute to the understanding of student engagement within contemporary technology-enabled learning environments and to inform the design of authentic teaching and assessment practices within Quantity Surveying education.

2 Literature Review

2.1 GenAI and Student Learning Behaviour

Artificial Intelligence (AI) refers to computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, and problem-solving (Russell & Norvig, 2021). Generative Artificial Intelligence (GenAI), a subset of AI, can generate human-like outputs such as text, images, and code through large-scale machine learning models (Kasneci *et al.*, 2023). The emergence of Large Language Models (LLMs), has significantly influenced HE by providing students with accessible tools for information retrieval, content generation, and learning support. Since the public release of ChatGPT in 2022, the adoption of GenAI within HE has increased rapidly (Kasneci *et al.*, 2023). Students increasingly use these tools for academic writing, idea generation, information retrieval, problem-solving, and assessment preparation (Baidoo-Anu *et al.*, 2024; Jose *et al.*, 2024). Research suggests that GenAI can improve learning accessibility, enhance productivity, support personalised learning experiences, and increase student motivation through timely and tailored academic assistance (Jose *et al.*, 2024; Timotheou *et al.*, 2023).

Despite these benefits, concerns remain regarding academic integrity, over-reliance on AI-generated outputs, reduced critical thinking, and diminished independent learning (Kasneci *et al.*, 2023; Qadir, 2023; Cotton *et al.*, 2024). Within built environment

education, academics have expressed concerns regarding plagiarism, assessment authenticity, and increasing student dependence on AI-generated content (Adebayo *et al.*, 2025). Consequently, HE institutions are increasingly reconsidering assessment design strategies to support responsible AI integration while maintaining authentic learning and competency development (Clegg & Sarkar, 2024; Rasul *et al.*, 2024).

2.2 Attendance, Engagement and Academic Performance

Student attendance has long been associated with academic achievement within HE (Fang *et al.*, 2024). Previous studies have demonstrated positive relationships between attendance, engagement, participation, and assessment performance, suggesting that regular attendance contributes to improved learning outcomes and academic success (Sanchez & Aleman, 2011; Bennett & Yalams, 2013). Attendance enables students to engage directly with teaching activities, interact with peers and tutors, and receive timely feedback that supports deeper learning and knowledge retention. The relationship between attendance and performance is closely linked to active learning principles. Beyond physical presence, meaningful engagement involves active participation, interaction with learning materials, and commitment to the learning process (Sanchez & Aleman, 2011; Fang *et al.*, 2024). Students who engage more actively with educational activities generally achieve stronger academic outcomes than those who participate minimally (Fang *et al.*, 2024).

The importance of attendance may be particularly significant within technical and professionally oriented disciplines. Subjects such as engineering, construction management, and Quantity Surveying require students to develop practical skills, analytical reasoning, and professional judgement through guided learning activities and iterative feedback processes (Bennett & Yalams, 2013). Therefore, attendance remains an important predictor of academic achievement despite increasing digital learning opportunities.

2.3 Attendance and Learning in AI-Enabled Environments

The growing availability of GenAI tools has created new opportunities for students to access academic support beyond traditional classroom settings. AI-powered systems can provide explanations, generate content, summarise information, and assist with problem-solving activities, allowing students to engage with learning materials independently and at any time (Kasneci *et al.*, 2023; Baidoo-Anu *et al.*, 2024). While these developments enhance accessibility and flexibility, they have also raised questions regarding student engagement and participation. Researchers have highlighted concerns that AI-supported learning may reduce interaction with teaching activities and alter

traditional learning behaviours (Cotton *et al.*, 2024; Rasul *et al.*, 2024). Consequently, students may perceive less reliance on scheduled teaching sessions when alternative forms of academic support are readily available.

However, limited empirical evidence examines whether attendance continues to matter for academic performance in AI-enabled learning environments, as most studies focus on GenAI opportunities and risks rather than attendance and achievement (Kasneci *et al.*, 2023; Timotheou *et al.*, 2023).

2.4 Quantity Surveying Measurement Education

Quantity Surveying (QS) measurement education is fundamental to the development of professional competency within built environment programmes. Measurement modules require students to interpret construction drawings, apply New Rules of Measurement (NRM) standards, undertake quantity take-offs, and prepare accurate quantities for cost estimating and Bills of Materials production (RICS, 2021). These activities require technical knowledge, numerical accuracy, analytical reasoning, and professional judgement (Qadir, 2023; Adebayo *et al.*, 2025). Unlike many theory-based subjects, QS measurement education relies heavily on practical and experiential learning approaches. Students develop competency through guided practice, classroom demonstrations, workshop activities, and continuous tutor feedback. The preparation of accurate quantity take-offs requires students to interpret design information, identify measurement requirements, and make informed professional decisions that extend beyond automated content generation (Qadir, 2023; Adebayo *et al.*, 2025).

While GenAI may support independent learning and information access, it cannot fully replicate the practical engagement, contextual understanding, and professional judgement required within Quantity Surveying practice. Consequently, attendance and active participation remain important components of competency development within QS measurement education (AI4QS, 2026).

2.5 Research Gap

Existing research has examined relationships between student attendance, engagement, and academic performance (Bennett & Yalams, 2013; Sanchez & Aleman, 2011; Fang *et al.*, 2024). However, most studies such as Bennett & Yalams (2013) and Fang *et al.* (2024) have been conducted within general HE contexts, with limited attention given to technical disciplines such as Quantity Surveying. Furthermore, little empirical evidence exists regarding whether attendance remains an important predictor of academic success within Quantity Surveying measurement education in increasingly AI-enabled learning

environments. To address this gap, this study examines attendance patterns and academic performance in a Level 4 Quantity Surveying Measurement module at a UK HE institution, within a learning environment where students have increasing access to GenAI tools that may support learning and assessment preparation. The study provides foundational evidence on whether attendance remains an important feature of academic performance in QS measurement education within a GenAI-enabled context.

3. Research Methodology

A single-case study design has been employed in this study, where a Level 4 Quantity Surveying Measurements module delivered within a full-time undergraduate QS programme at a UK HE institution has been selected as the case. This design is justified by the fact that case studies can incorporate, or even be solely dependent upon, quantitative evidence (Yin, 2009). The relationship between student attendance and academic performance where GenAI tools are readily available has been examined by conducting descriptive statistical analysis. The study does not measure the direct influence of GenAI but investigates attendance-performance relationships within a contemporary AI-enabled learning context.

The module comprised two coursework assessments: CW01 (25%), an individual presentation assessing understanding of measurement principles and communication skills, and CW02 (75%), a cost-estimating exercise requiring students to prepare quantities from construction drawings. CW02 assessed technical competency, quantity take-off skills, numerical accuracy, and professional judgement. The initial dataset contained 84 student records, including attendance data, coursework marks, final grades, and progression outcomes. Twenty-four records were excluded due to DNS (Did Not Submit) and DNP (Did Not Participate) outcomes, resulting in a final sample of 60 students. Attendance was measured across ten scheduled teaching sessions. Assessment performance was evaluated using CW01 and CW02 marks, and final weighted module grades. Descriptive statistical analysis was used to examine attendance distributions, average performance, pass rates, and variations between assessment components.

Institutional ethical approval was granted for the use of this secondary data, and all records were processed in accordance with GDPR and university data protection policies. Student data were anonymised prior to analysis. The findings are limited to a single institution and module context. In addition, the study relies on descriptive statistics and does not directly measure student use of GenAI technologies. Therefore, the findings should be interpreted within these limitations.

4. Findings and Discussion

4.1 Overall Attendance and Assessment Performance Profile

The analysis of 60 valid student records demonstrated notable variation in both attendance and assessment performance. According to Table 1 below, the average attendance across the module was 5 out of 10 sessions. The average final weighted grade was 49.48%, while the average CW01 and CW02 marks were 52.82% and 48.37%, respectively. The minimum and maximum values also indicate a wide spread of performance across the cohort. Final weighted grades ranged from 13.25% to 93.50%, while CW02 marks ranged from 7% to 98%. Attendance also varied across the full range of the module sessions, from 1 out of 10 sessions to 10 out of 10 sessions. Of the 60 students analysed, 32 students achieved the module pass mark of 40%, resulting in an overall pass rate of 53.33%.

Table 1 provides an overall descriptive profile of the dataset. It summarises average performance, minimum and maximum marks, and overall attendance distribution. Further analysis was conducted to recognize the attendance-based performance patterns, which are discussed separately in Section 4.2.

Students who attended one to three sessions achieved average final grades between 29.38% and 32.21%, with pass rates ranging from 14.29% to 20.00%. In contrast, students who attended seven to ten sessions achieved average final grades between 64.79% and 77.50%, with pass rates ranging from 76.92% to 100.00%.

To avoid overinterpreting individual attendance categories with small student numbers, the data were also analysed using three broader attendance bands. Students in the low-attendance group (1–3 sessions) achieved an average final grade of 30.94% and a pass rate of 16.67%, whereas students in the high-attendance group (7–10 sessions) achieved an average final grade of 67.23% and a pass rate of 85.71%. Students in the high-attendance group achieved average grades more than twice those of students in the low-attendance group, highlighting the substantial difference in academic outcomes between the two attendance categories. These findings indicate that students in the high-attendance group generally achieved substantially stronger academic outcomes than those in the low-attendance group.

While these descriptive findings suggest an association between attendance and academic performance within

Table 1: Descriptive statistics of assessment performance and attendance.

Variable	Mean	Minimum	Maximum
CW01 Mark	52.82	29	87
CW02 Mark	48.37	7	98
Final Grade	49.48	13.25	93.50
Attendance	5/10	1/10	10/10

4.2 Attendance Patterns and Academic Performance

As shown in Table 2, student attendance varied across the ten scheduled teaching sessions. The table presents the number of students in each attendance category together with the corresponding average final grade and pass rate. The results indicate a consistent attendance-performance pattern, whereby students in higher attendance categories generally achieved stronger academic outcomes than students in lower attendance categories.

this cohort, they should not be interpreted as evidence of a statistically tested relationship or causal effect. Other factors, including prior academic ability, independent study habits, quality of engagement, confidence with measurement tasks, and access to additional learning support, may also have influenced student outcomes. Within Quantity Surveying measurement education, this pattern is pedagogically relevant because measurement learning requires students to interpret construction drawings, apply measurement principles, practise quantity take-off

Table 2: Attendance patterns and academic performance.

Attendance	No. of students	Average Final Grade (%)	Pass Rate (%)
1 Session	7	32.21	14.29
2 Sessions	5	31.05	20.00
3 Sessions	6	29.38	16.67
4 Sessions	6	50.54	66.67
5 Sessions	9	46.31	44.44
6 Sessions	6	46.67	50.00
7 Sessions	13	64.79	76.92
8 Sessions	4	70.00	100.00
9 Sessions	3	70.67	100.00
10 Sessions	1	77.50	100.00

procedures, and receive feedback on technical errors. These activities are often developed through repeated guided practice and tutor-supported learning. Therefore, the attendance-performance pattern observed in this module is consistent with wider literature that recognises attendance and participation as important contributors to learning in applied and technical disciplines.

4.3 Variations Between Coursework Components

The analysis identified notable differences in performance between CW01 and CW02 among some students. Several students achieved higher marks in CW01 than in CW02, with differences ranging from 25 to 60 percentage points between the coursework components, as shown in Table 3. While direct GenAI use was not measured in this study, these variations raise broader questions about assessment design, assessment authenticity, and the extent to which different coursework formats evidence students' applied technical understanding.

Table 3: Students demonstrating substantially higher CW01 performance relative to CW02

Student	CW01 (%)	CW02 (%)	Difference (CW01 – CW02)	Attendance
S1	81	21	+60	7/10
S2	80	20	+60	7/10
S3	61	22	+39	7/10
S4	56	21	+35	6/10
S5	51	16	+35	6/10
S6	54	20	+34	5/10
S7	51	21	+30	1/10
S8	71	41	+30	9/10
S9	48	20	+28	1/10
S10	32	7	+25	5/10

Alternative explanations may include differences in assessment format, student preparation strategies, communication skills, assessment weighting, and individual learning preferences. Therefore, the observed differences between CW01 and CW02 should not be attributed to any single factor. The cases presented in Table 3 indicate that performance was not always consistent across the two coursework components. This may partly reflect the different demands of CW01 and CW02. As outlined in the methodology, CW01 and CW02 had different assessment weightings and required students to demonstrate measurement-related learning in different ways. CW02 carried the higher weighting and required students to demonstrate applied technical understanding through measurement-related tasks. In Quantity Surveying education, such tasks require students to interpret construction information, apply measurement principles, undertake quantity take-off activities, and demonstrate technical reasoning linked to professional measurement practice.

The findings suggest that assessment design remains important in technical Quantity Surveying education. However, the present study was not designed to evaluate assessment effectiveness directly, and therefore these observations should be interpreted as exploratory rather than conclusive. Assessment formats that require students to demonstrate process, reasoning, and applied decision-making may provide stronger evidence of measurement competence than formats that primarily assess the final output or presentation of knowledge.

4.4 Interpretation of Findings in Relation to QS Measurement Education

The findings suggest that attendance and assessment design remain important considerations in Quantity Surveying measurement education within a GenAI-enabled learning environment. The attendance pattern presented in Section 4.2 suggests that students with higher attendance generally achieved stronger final grades and pass rates. This pattern is consistent with previous studies that associate attendance, participation

and engagement with stronger academic performance in HE and technical learning contexts (Sanchez & Aleman, 2011; Bennett & Yalams, 2013; Fang *et al.*, 2024). The CW01–CW02 variation discussed in Section 4.3 further indicates that student performance was not always consistent across assessment components, highlighting the need to consider how different assessment formats evidence applied technical understanding.

This is particularly relevant to measurement education because Quantity Surveying students are required to develop procedural and applied competencies, including drawing interpretation, measurement sequencing, quantity take-off, application of measurement principles, and professional judgement. These competencies align with the technical requirements of detailed measurement practice set out in NRM2 (RICS, 2021). Within technical and professionally oriented disciplines, such competencies are commonly developed through guided practice, feedback, repeated application and engagement with problem-solving activities (Bennett & Yalams, 2013;

Qadir, 2023). While GenAI tools may support access to information, explanation and independent learning, existing literature also highlights concerns about over-reliance, reduced critical engagement and assessment authenticity in AI-enabled learning environments (Kasneci *et al.*, 2023; Cotton *et al.*, 2024; Rasul *et al.*, 2024; Adebayo *et al.*, 2025). The variation between CW01 and CW02 also reinforces the need to consider how assessment components capture different forms of learning. Assessment tasks that require students to explain, calculate, interpret, justify and demonstrate their measurement decisions may provide richer evidence of competency development than tasks that assess only final outputs. This is consistent with literature emphasising assessment authenticity and the need to evidence students' own reasoning, decision-making and applied competence in GenAI-enabled HE (Rasul *et al.*, 2024). In AI-enabled learning environments, assessment authenticity depends not only on what students submit, but also on how clearly they demonstrate the process through which technical understanding has been developed.

Therefore, the findings contribute to discussions on QS pedagogy by showing that attendance, engagement with technical learning activities and assessment design remain closely connected to the development of measurement competence. More specific recommendations for teaching and assessment design are presented in the conclusion, in line with the scope of the empirical findings.

5. Conclusion and Further Research

This study investigated the relationship between student attendance and academic performance within a Level 4 Quantity Surveying Measurements module delivered at a UK HE institution.

The analysis identified a consistent attendance-performance pattern whereby students in higher

attendance categories generally achieved stronger assessment outcomes and pass rates than students in lower attendance categories. Students attending seven to ten sessions achieved considerably higher average grades and pass rates than those attending one to three sessions. These findings suggest that regular attendance remains an important component of academic performance within Quantity Surveying measurement education. The study also identified variations in performance across different assessment components, suggesting that assessment format may influence how students demonstrate technical understanding and competency. Furthermore, the findings suggest that attendance alone does not guarantee academic success, highlighting the importance of meaningful engagement, participation, and active involvement in learning activities.

This study contributes to the Quantity Surveying education literature by providing empirical evidence of attendance-performance patterns within a technical measurement module. The findings support the continued importance of attendance, engagement, guided learning, and practical competency development within Quantity Surveying education.

Future research should investigate how emerging technologies, including Generative Artificial Intelligence (GenAI), may influence student engagement, attendance patterns, and assessment performance within built environment education. Such research should incorporate direct measures of student AI use to better understand the relationship between AI-supported learning behaviours and academic outcomes.

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