

Maintenance of Student Residential Facilities and Its Influence on Students' Well-Being and Academic Performance: Evidence from Public and Private Hostels at the University of Mines and Technology, Ghana

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Abstract

This study examined the impact of maintenance of students' residential facilities on student well-being and academic performance at the University of Mines and Technology (UMaT), addressing three key objectives: assessing maintenance practices based on ownership type, examining the effect of maintenance on student well-being, and investigating its effect on academic performance. A sample of 320 respondents was drawn from a population of 1,662 students residing in three selected hostels, public and private, with 276 questionnaires successfully retrieved and used for analysis. Maintenance conditions were evaluated across electrical, plumbing, masonry, and carpentry components, revealing significant disparities across ownership types. Private facilities consistently outperformed public counterparts, with plumbing systems emerging as the most critically deficient category, particularly in publicly owned accommodation, while a pervasive culture of apathy toward maintenance of publicly owned properties was confirmed. Regression analysis established that maintenance quality was a significant positive predictor of student well-being, with improvements in residential maintenance yielding measurable gains in well-being outcomes. Maintenance quality similarly demonstrated a stronger positive relationship with academic performance, with better-maintained residential environments providing students with more supportive ecological conditions for academic engagement. Through Bronfenbrenner's Ecological Systems Theory, the residential facility was identified as a critical microsystemic environment whose physical condition directly shapes the proximal processes underpinning both student well-being and academic achievement. The study recommends that universities adopt formalised preventive maintenance systems and that funding bodies allocate maintenance resources proportionally to facility condition, concluding that student residential facility maintenance is a structural determinant of student outcomes warranting urgent and sustained institutional attention.

KEYWORDS: Maintenance, Student, Residential, Facilities, Wellbeing.

Introduction

Building maintenance is a critical determinant of asset longevity, functionality, and user well-being in higher education institutions, yet it remains chronically underfunded and reactive across many universities

globally, particularly in developing countries. Timely interventions preserve designed utility, extend service life, and prevent costly premature deterioration (Oyewale, 2018). However, contemporary research reveals a pervasive "breakdown maintenance culture" in African universities, where repairs are executed only after failure rather than through planned preventive regimes, resulting in accelerated deterioration, reduced asset value, and compromised institutional performance (Ebekozi et al., 2023). Studies from Nigerian universities document that inadequate maintenance leads to visible decay, moribund aesthetics, and service delivery failures that undermine teaching, research, and residential environments (Oyetunji and Oluleye, 2021; Odeyemi, Adeniyi, and Amoo, 2019). In Ghana, research on colleges of education found generally low maintenance orientation among staff and students, with consequential delays in executing maintenance works and a lack of equipped maintenance units (Gyenfie et al., 2019). This maintenance deficit is not merely an operational inconvenience but represents a fundamental threat to institutional sustainability and occupant safety, as buildings that could serve for decades prematurely fail due to neglect, particularly in public properties where ownership diffusion fosters apathy toward upkeep. The distinction between public and private building maintenance practices reveals significant disparities in management approaches, resource allocation, and outcomes. Research comparing government-owned and privately owned tertiary institutions documents divergent facility management policies, with private institutions often adopting more streamlined procurement and management arrangements despite facing similar challenges of funding constraints, construction quality issues, and complaint response delays (Odeyemi et al., 2019). Public universities frequently lack clear maintenance policies, adequate budgeting, and dedicated maintenance units, perpetuating reactive rather than preventive maintenance strategies (Wang et al., 2022; Desbalo et al., 2024). Case studies from the University of Lagos, Bells University, and Federal University of Technology Akure report that occupants' most frequent maintenance requests concern sanitation and water distribution systems, with respondents consistently citing substandard replacement materials and slow repair response times (Ogunbayo et al., 2022). The economic consequences of poor maintenance culture are substantial: deferred maintenance increases long-term costs, necessitates premature rehabilitation or replacement, and erodes institutional returns on capital investment (Shin and Lee, 2016). Best practice frameworks emerging from recent scholarship recommend Computerised Maintenance Management Systems (CMMS), standardised maintenance contracts, periodic inspection programmes, and clear budgeting structures to transition from breakdown to preventive maintenance regimes (Ayoko et al., 2023; Pampana et al., 2024).

Despite existing studies on the enhancement of maintenance of hostel facilities and student satisfaction (Midhal et al., 2024), as well as post-occupancy evaluation of student housing (Almalki, 2022), there remains a significant gap in research on the maintenance of hostel facilities and its effects on students' well-being and academic performance, particularly within the context of higher education in Ghana. At UMaT, student residential facilities represent a critical component of campus infrastructure requiring systematic maintenance assessment and improvement. The university comprises various zones, academic, residential, health, and commercial, student housing facilities which warrant particular attention given their direct impact on student welfare, academic performance, and institutional reputation.

This study aims to compare maintenance levels across public and private student residential facilities on the UMaT campus. It assesses the state of maintenance practices in student residential facilities based on ownership type, examines the effect of maintenance on student well-being, and investigates its influence on academic performance at UMaT.

This research responds to the documented need for institution-specific maintenance assessments that can guide the transition from reactive breakdown culture to proactive preventive maintenance systems.

Related Literature

Theoretical Framework

The study employs the ecological system theory as the fundamental theory for the conduct of this study. This theory emphasises the multiple environmental systems that influence an individual's development, including immediate settings like housing.

Bronfenbrenner's Ecological Systems Theory (EST) organizes human development within five interconnected environmental layers: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1995). While the macrosystem reflects the broader cultural values and societal expectations that shape individual experience, the chronosystem captures how development is influenced by the passage of time, including major life transitions and shifting historical contexts (Bronfenbrenner, 1979). A central principle of the theory is that this influence is not one-directional; rather, individuals and their environments continuously shape one another in a dynamic, reciprocal process (Bronfenbrenner & Morris, 2006).

The theory has been widely adopted across fields such as education, psychology, and social work due to its versatility in explaining complex developmental outcomes. Scholars have drawn on it to examine how institutional policies at the exosystem level and prevailing community attitudes within the macrosystem affect the academic and social experiences of marginalised populations (Neal & Neal, 2013). Within the scope of this study, the learning environment framework proposed by Hassan et al. (2020) is grounded in selected categories from Bronfenbrenner's (1995) ecological model, providing a structured lens through which environmental influences on learning can be understood and analysed.

Research on maintenance, encompassing its types, importance, policies, and strategies, has emerged as a critical area of inquiry due to its fundamental role in ensuring the longevity, safety, and operational efficiency of buildings and industrial assets (Al Turki et al., 2014; Afolalu et al., 2024). Historically, maintenance evolved from rudimentary corrective actions before World War II to sophisticated, technology-driven strategies in the post-war era, reflecting advancements in industrial and building management (Campbell et al., 2001; Afolalu et al., 2024). The significance of maintenance is underscored by its impact on asset value preservation, cost reduction, and user safety, with studies indicating that inadequate maintenance leads to accelerated deterioration and increased operational risks (Villanueva et al., 2017; Kadhim and Altaie, 2023). Globally, maintenance accounts for a substantial portion of operational budgets, emphasizing the need for optimized approaches (Christen and Wallbaum, 2011; Velmurugan and Dhingra, 2021).

Despite extensive research, a persistent knowledge gap exists regarding the integration and contextual adaptation of maintenance strategies and policies, particularly in diverse sectors such as public buildings, educational institutions, and heritage structures (Ogunbayo and Aigbavboa, 2022; Gracki and Plebankiewicz, 2024). While preventive, corrective, and predictive maintenance are well-documented, the selection and implementation of appropriate strategies remain inconsistent, influenced by organisational, economic, and environmental factors (Adaramola et al., 2024; West et al., 2024). Controversies arise between proponents of reactive versus proactive maintenance, with debates on cost-effectiveness, technological feasibility, and operational impact (Stamboliska et al., 2014; West et al., 2024). The absence of standardised maintenance policies, especially in developing contexts, exacerbates inefficiencies and

undermines asset sustainability (Yahya et al., 2011; Ogunbayo et al., 2022), resulting in suboptimal maintenance outcomes, including increased downtime, safety hazards, and financial losses (Amponsah-Kwatiah et al., 2021; Ichendu and Irimiagha, 2024).

Maintenance is a systematic set of technical and administrative actions aimed at preserving or restoring asset functionality (Villanueva et al., 2017). Maintenance types corrective, preventive, and predictive, are interrelated components within a strategic management system that aligns organizational objectives with operational practices (Velmurugan and Dhingra, 2021). Building maintenance policy serves as the guiding principle that shapes strategy formulation and execution, ensuring resource optimisation and performance standards (Ogunbayo et al., 2022). This systematic review synthesises current knowledge on maintenance types, their importance, and the formulation of building maintenance policies and strategies, employing comprehensive literature analysis incorporating empirical studies, theoretical models, and case evaluations (Hauashdh et al., 2024). By addressing identified gaps, this review contributes to enhancing maintenance decision-making and policy development, particularly in contexts lacking standardised frameworks (Edyta and Gracki, 2024).

Research classifies maintenance into corrective, preventive, predictive, condition-based, and advanced strategies such as reliability-centred and risk-based maintenance, emphasising the benefits and trade-offs of each type and highlighting the shift towards proactive maintenance to optimise asset performance and reduce downtime (Stamboliska et al., 2015; Pluméry and Kim, 2024). Studies discuss integration and hybrid approaches for improved effectiveness (Pluméry and Kim, 2024), with frameworks and models proposing structured approaches integrating multi-criteria decision-making, cost-benefit analysis, and benchmarking tools tailored to organisational needs, asset types, and operational contexts, often employing methods such as fuzzy logic and Monte Carlo simulation to optimize decision-making (Peiris and Silva, 2019; Ighravwe and Oke, 2019; Kheradranjbar et al., 2023). The evolving complexity of maintenance necessitates strategic alignment with business objectives.

Maintenance is recognised as essential for prolonging asset life, ensuring safety, and maintaining operational efficiency across building and industrial contexts, with research identifying it as crucial for minimising operational costs, preventing failures, and sustaining building performance (Kadhim and Altaie, 2023; Ichendu and Irimiagha, 2024). Empirical evidence links proper maintenance to enhanced facility resilience and user satisfaction, while preventive and predictive maintenance are underscored for their role in reducing depreciation and operational disruptions (Dzulkifli et al., 2021). Sustainable maintenance practices are gaining prominence, emphasising environmental, social, and economic dimensions through strategies incorporating energy efficiency, waste reduction, and stakeholder participation to achieve sustainable asset management (Ansori et al., 2025). Frameworks align with global goals like the Sustainable Development Goals (SDGs) and climate change mitigation, promoting sustainable maintenance in various building types, including heritage and educational facilities, with studies indicating a shift from profit-centric to balanced sustainability approaches.

Organisational, financial, and technical challenges impacting maintenance effectiveness are widely addressed, with studies identifying factors such as inadequate funding, poor management, lack of skilled workforce, and insufficient communication as barriers to optimal maintenance practices (Amponsah Kwatiah et al., 2021; Mensah et al., 2023). The importance of structured systems, performance monitoring, and stakeholder collaboration is highlighted for improving maintenance culture and outcomes, with contextual differences in developing countries especially noted. Research focuses on maintenance strategies tailored to particular building types, such as public institutions, low-cost housing, heritage

structures, and schools, considering unique environmental, climatic, and operational conditions (Ismael, 2024; Arifin et al., 2024).

Methodology

The study was conducted at the University of Mines and Technology in Tarkwa to quantitatively collect data. UMaT is a vibrant university community comprising lecture halls, auditoriums, administrative offices, staff and student residential buildings, maintenance buildings, and various commercial facilities. The focus of this study was specifically on students' residential buildings, which formed the basis for their selection as the study area.

Data collection was carried out using a combination of quantitative methodologies, with primary data gathered through field surveys conducted at the selected UMaT student residential buildings. Simple random sampling is employed for populations that are extremely homogeneous, wherein participants are randomly chosen to partake in the study (Bhardwaj, 2019). A comprehensive population list is required, although it is not always easily accessible (Cohen et al., 2018). The selection of only three buildings was attributed to time and financial constraints.

The population comprises the complete set of people from whom the researcher seeks information (Stockemer, 2019). The population of the study comprises one thousand, six hundred and sixty-two students residing in the selected hostels.

A random sampling technique was employed to select three student residential buildings, representing private and public categories. Simple random sampling is a widely employed sampling technique in scientific research. Simple random sampling is employed for populations that are extremely homogeneous, wherein participants are randomly chosen to partake in the study (Bhardwaj, 2019). Simple random sampling is the most fundamental and prevalent technique for sample selection, wherein each unit is chosen individually, with an equal probability of selection for every unit during each draw (Singh, 2003). The sample size was determined using the Yamane formula, which yielded a total of 320 respondents;

$$n = \frac{N}{1 - N(e)^2} \dots (i). \text{ From the equation, (i) } n = \frac{1662}{1 - 1662(0.05)^2}, \text{ where, } n=320. \text{ Therefore, the sample for the study was 320 respondents; however, only 276 questionnaires, representing 86.25\%, were successfully retrieved and used for analysis.}$$

The survey approach was chosen because it uses questioning strategies to assess objective data, subjective opinions, or observed behaviours. Alderman and Salem (2010) assert that survey technique functions as a tool for gathering data from a broader participant base.

The collected data were processed, classified, and systematically analysed to address research questions and objectives. The data were further tabulated for orderly presentation and easier comparison. Statistical Package for Social Sciences (SPSS), version 23, was used to analyse the number of respondents and relevant variables, ultimately bringing to light the maintenance levels across the various student residential facilities studied.

To answer the study objectives successfully, multiple statistical approaches were applied. Descriptive statistics, including frequencies, percentages, means, and standard deviations. A multivariate regression analysis was employed to evaluate the impact of maintenance of housing facilities on students' wellbeing and academic performance. This statistical approach is ideal for assessing situations where several independent variables influence a dependent variable (Astivia and Zumbo, 2019).

Results and Discussion

Demographic Characteristics of Respondents

In this research, the scope consisted of students’ residential buildings on the UMaT Campus. Table 4.1 below demonstrates the categorisation of respondents involved in the study. It has been shown in the table that sixty-one (61) respondents, representing 22.1%, are residents of Castle Gate, one hundred and fifteen (115) respondents, representing 41.7%, are residents of K. T. Hall; and one hundred (100) respondents, representing 36.2%, are residents of Figenco. It can therefore be deduced that the majority of respondents are K. T. Hall residents as far as this research is concerned.

Table 1: Category of respondents

| Hostel or Hall | Frequency | Percentage (%) |
|----------------|-----------|----------------|
| Castle Gate | 61 | 22.1 |
| K. T. Hall | 115 | 41.7 |
| Figenco | 100 | 36.2 |
| Total | 276 | 100.0 |

Source: Author’s Field Survey, 2026.

Maintenance Practices in Student Residential Facilities

In response to the first research question of the study, the table below presents the findings of the questionnaire administered.

Table 2: Level of maintenance

| Category | Component | Castle Gate (Private) | K. T. Hall (Public) | Figenco (Private) |
|--------------------|--------------|-----------------------------|--------------------------|-----------------------|
| ELECTRICALS | Light bulbs | 50.82% Good condition | 38.26% Good condition | 37% Good condition |
| | Fans | 75.41% Good condition | 74.8% Absent, 5.21% Good | 70% Good condition |
| | Switches | 22.61% Faulty | 57.39% Faulty | 38% Good condition |
| | Sockets | 34.43% Good, 34.43% Faulty | 41.74% Faulty | 45% Faulty, 40% Good |
| | Wiring | 62.30% Neutral, 37.70% Good | 52.20% Neutral | 45% Good condition |
| PLUMBING | Water Closet | 55.74% Good condition | 48.70% Faulty | 45% Faulty, 1% Good |
| | Shower head | 49.18% Neutral, 44.26% Good | 35.65% Good condition | 46% Neutral, 40% Good |

| Category | Component | Castle Gate (Private) | K. T. Hall (Public) | Figenco (Private) |
|-----------|-----------|-----------------------------|-------------------------------|-------------------------|
| MASONRY | Taps | 62.30% Neutral, 37.70% Good | 38% Faulty, 40.87% Neutral | 66% Neutral, 19% Faulty |
| | Sink | 49.18% Neutral, 32.79% Good | 42.61% Neutral, 37.39% Faulty | 48% Neutral, 39% Good |
| | Drain | 49.18% Good condition | 69.57% Neutral | 47% Good, 39% Faulty |
| | Pipes | 39.34% Good, 37.70% Neutral | 25.21% Faulty, 23.48% Neutral | 52% Good condition |
| | Wall | 72.13% Good condition | 51.30% Neutral, 43.48% Faulty | 63% Good condition |
| | Tiles | 77.05% Good condition | 71.30% Neutral | 59% Neutral, 38% Good |
| | Flooring | 44.26% Good, 37.70% Neutral | 69.57% Neutral | 76% Neutral, 3% Good |
| | Skirting | 42.62% Faulty, 36.07% Good | 57.39% Faulty | 38% Good, 34% Neutral |
| | Column | 62.30% Neutral, 37.70% Good | 61.74% Neutral | 51% Neutral, 49% Good |
| | Slab | 55.74% Neutral, 44.26% Good | 59.13% Neutral | 73% Neutral, 27% Good |
| CARPENTRY | Beam | 54.10% Neutral, 45.90% Good | 58.26% Neutral | 64% Good, 36% Neutral |
| | Doors | 55.74% Neutral, 39.34% Good | 48.70% Neutral, 42.61% Good | 51% Good, 49% Neutral |
| | Windows | 59.02% Neutral, 40.98% Good | 57.39% Neutral, 32.17% Faulty | 78% Good condition |

| Category | Component | Castle Gate (Private) | K. T. Hall (Public) | Figenco (Private) |
|----------|-----------|-----------------------------|---------------------|-----------------------|
| | Roof | 63.93% Neutral, 36.07% Good | 65.23% Neutral | 59% Neutral, 39% Good |
| | Wardrobe | 47.54% Neutral, 36.07% Good | 53.04% Neutral | 75% Neutral, 16% Good |
| | Shelves | 65.57% Neutral, 34.43% Good | 60.87% Faulty | 70% Neutral, 30% Good |

Source: Author’s Field Survey, 2026.

From Table 2, electrical, plumbing, masonry, and carpentry aspects were considered for the individual students’ residential buildings.

The electrical systems analysis reveals significant disparities in maintenance quality across the three facilities, with ownership type clearly influencing outcomes. Castle Gate Hostel demonstrates superior electrical maintenance, particularly in fans, where 75.41% are in good condition compared to K. T. Hall's alarming 74.8% absence rate and only 5.21% in good condition. However, the private facility struggles with switches (22.61% faulty), while Figenco performs best in this component with 38% in good condition. Light bulbs show relatively consistent performance across all facilities, ranging from 37% to 50.82% in good condition, though the private hostel maintains the edge. The pattern of socket maintenance is particularly concerning across all facilities, with fault rates between 34.43% and 45%, indicating a systemic issue.

Plumbing systems present the most critical maintenance challenges, especially in the public facilities. Water closets emerge as the most problematic component, with K. T. Hall showing 48.70% faulty and Figenco exhibiting an even worse condition at 45% faulty with only 1% in good condition. Castle Gate maintains the best performance at 55.74% good condition, though this still indicates room for improvement. The data reveals that while showerheads maintain relatively acceptable conditions across all facilities (ranging from 35.65% to 44.26% good), taps consistently show predominantly neutral ratings, suggesting delayed maintenance that could escalate to failures. Notably, pipes in Figenco achieve 52% good condition, outperforming both other facilities, while K. T. Hall records 25.21% faulty pipes, highlighting the severe maintenance deficit in public facilities.

Masonry components demonstrate that while structural elements remain stable, aesthetic and functional surfaces suffer from inadequate maintenance. Castle Gate excels in walls (72.13% good) and tiles (77.05% good), establishing clear visual quality standards associated with private ownership. In contrast, K. T. Hall shows 43.48% of walls as faulty and 71.30% of tiles rated neutral, indicating ageing infrastructure requiring intervention. Flooring presents a concerning trend across all facilities, with Figenco recording only 3% in good condition and 76% neutral, suggesting widespread deterioration that has not yet reached critical failure.

Carpentry work shows moderate maintenance levels with notable variations in specific components across the facilities. Windows represent the widest performance gap, with Figenco achieving an impressive 78% good condition while K. T. Hall manages only 10.43% good and 32.17% faulty, suggesting insufficient window maintenance in the public facility. Doors maintain relatively consistent neutral-to-good ratings across all hostels, indicating this component receives adequate attention regardless of ownership. However, wardrobes and shelves reveal concerning patterns, with K. T. Hall recording 60.87% of shelves as faulty, the highest single fault rate in the carpentry category, while Figenco shows 75% of wardrobes in neutral condition. From the analysis, it was deduced that private properties were better maintained than the public one. A lot of people are apathetic towards maintenance if the property in any way belonged to the public, that is, property belonging to the government.

Maintenance of Student Residential Facilities on Student Well-Being

In response to the second objective of the study, the regression table below presents the results from the data gathered.

From Table 4, the unstandardised coefficient ($\beta = 1.270$, $p = .000$) indicates that for every one-unit improvement in the Maintenance of Students' Residential Facilities (MSRF), student well-being increases by 1.270 units, holding all else constant. This positive and significant relationship is evident in the t-statistic of 10.528, confirming the substantive contribution of MSRF to student well-being. The model's coefficient of determination ($R^2 = 0.288$) reveals that approximately 28.8% of the variance in student well-being is explained by MSRF.

Through the lens of ecological system theory, the statistically significant positive coefficient ($\beta = 1.270$) is therefore not merely an empirical artefact but a theoretically anticipated outcome: improvements in the microsystemic conditions of student housing, as operationalised through maintenance, create enabling conditions for student well-being, aligning with the core prediction of Bronfenbrenner's model that the quality of the immediate environment is a primary determinant of individual outcomes.

The findings agree with the findings of Maina et al. (2026), who investigated residential satisfaction within student housing facilities in the near-campus neighbourhood of Samaru Zaria, northwest Nigeria. Their study identified physical facility conditions, particularly maintenance standards, as one of the foremost determinants of residential satisfaction, with students who reported well-maintained facilities demonstrating significantly higher satisfaction scores.

Table 3: ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|---------|-------|
| 1 | Regression | 2459.552 | 1 | 2459.552 | 110.838 | .000b |
| | Residual | 6080.560 | 274 | 22.192 | | |
| | Total | 8540.112 | 275 | | | |

a. Dependent Variable: Student Wellbeing; b. Predictors: (Constant), MaintenanceResiFaci

Table 4: Coefficients^a

| Variable | β | Std. Error | t | Sig. |
|----------|---------|------------|-------|------|
| Constant | 9.912 | 1.512 | 6.556 | .000 |

| | | | | |
|---|-------|-------|--------|------|
| Maintenance of Students' Residential Facilities | 1.270 | 0.121 | 10.528 | .000 |
|---|-------|-------|--------|------|

Dependent Variable: Student Wellbeing; MSRF = Maintenance of Students' Residential Facilities

$R = .537; R^2 = 0.288; \text{Adjusted } R^2 = 0.285; F(\text{Stat}) = 110.838; P(F\text{-Stat}) = 0.000$

Source: Field Data (2026)

Maintenance of Residential Facilities on Academic Performance

In response to the third objective of the study, the regression table below presents the results from the data collected.

Table 6 constitutes a statistically compelling model establishing a significant positive relationship between the Maintenance of Students' Residential Facilities (MSRF) and academic performance. The unstandardised coefficient ($\beta = 1.185, p = .000$) indicates that for every one-unit improvement in MSRF, academic performance increases by 1.185 units, all else being equal. The model's coefficient of determination ($R^2 = 0.375$) reveals that MSRF alone accounts for approximately 37.5% of the variance in academic performance, and the F-statistic of 164.397 ($p = .000$) validates the overall model fit with a high degree of confidence. The correlation coefficient ($R = .612$) further denotes a strong positive association between MSRF and academic performance, situating facility maintenance as substantively important. Through the lens of the study's theoretical framework, ecological system theory, the macrosystemic conditions create the structural context within the regression table. The significant positive relationship between MSRF and academic performance ($\beta = 1.185$) implies that in a macrosystemic environment where maintenance standards are generally low, students in relatively better-maintained facilities enjoy a meaningful competitive advantage in academic performance, not because they are more capable, but because their ecological conditions better support the proximal processes of academic achievement.

The findings align substantively with Ogunbayo and Aigbavboa's (2019) core finding that the state of residential facility maintenance in Nigerian HEIs was a significant barrier to student academic performance. Their study found that students in poorly maintained hostels reported chronic sleep disruption, increased illness frequency, heightened stress, and reduced study time, all of which would mechanistically depress academic performance.

Table 5: ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|---------|-------|
| 1 | Regression | 3557.160 | 1 | 3557.160 | 164.397 | .000b |
| | Residual | 5928.600 | 274 | 21.638 | | |
| | Total | 9485.760 | 275 | | | |

a. Dependent Variable: Academic Performance; b. Predictors: (Constant), MaintenanceResiFaci.

Table 6: Coefficients^a

| Variable | β | Std. Error | t | Sig. |
|---|---------|------------|--------|------|
| Constant | 11.245 | 1.432 | 7.853 | .000 |
| Maintenance of Students' Residential Facilities | 1.185 | 0.092 | 12.822 | .000 |

Dependent Variable: Academic Performance; MSRF = Maintenance of Students' Residential Facilities

$R = .612$; $R^2 = 0.375$; Adjusted $R^2 = 0.373$; $F(\text{Stat}) = 164.397$; $P(F\text{-Stat}) = 0.000$

Source: Field Data (2026)

Conclusion and Recommendation

Conclusion

This study examined maintenance practices and their effects on student outcomes across public and private, student residential facilities at the University of Mines and Technology (UMaT). Three key objectives guided the investigation: assessing the state of maintenance practices based on ownership type, examining the effect of maintenance on student well-being, and investigating its effect on academic performance. Maintenance conditions were evaluated across electrical, plumbing, masonry, and carpentry components. The findings revealed significant disparities across ownership types, with the private facility consistently outperforming the private and public facilities across most maintenance categories. Plumbing systems presented the most critical deficiencies, particularly in the public facility, while masonry and carpentry components reflected widespread deterioration and neglect. The analysis confirmed a clear pattern of institutional apathy toward maintenance in publicly owned residential properties, establishing that private ownership was associated with considerably superior maintenance outcomes compared to public alternatives.

Regression analysis revealed that the maintenance of students' residential facilities was a significant positive predictor of student well-being, indicating that improvements in residential maintenance quality yielded measurable gains in student well-being outcomes. These findings position the residential facility as a critical microsystemic environment whose physical condition directly enables or constrains the proximal processes underpinning student well-being.

The effect of residential facility maintenance on academic performance was equally significant and comparatively stronger than its effect on well-being, with maintenance quality emerging as a substantive predictor of academic outcomes. Within the macrosystemic dimension of Bronfenbrenner's framework, students in better-maintained residences were found to enjoy a meaningful ecological advantage in academic achievement, not through superior individual ability, but through living conditions that more effectively supported the proximal processes of academic engagement, including adequate rest, reduced illness, and productive study behaviour. Students in poorly maintained facilities, by contrast, experienced chronic disruptions to sleep, health, and concentration, all of which mechanistically depressed academic performance.

Recommendation

The study recommends the following:

- Universities should transition from reactive, breakdown-driven maintenance approaches to formalised preventive maintenance systems encompassing regular inspection cycles for electrical, plumbing, masonry, and carpentry components.
- University management and national higher education funding bodies should allocate maintenance resources proportionally to assessed facility condition.
- Students should be formally incorporated into residential maintenance governance through digital fault-reporting platforms, periodic facility condition surveys, and student representation on facilities management committees.

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