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Examination Malpractice in Mathematics during WASSCE and its Impact on First-Year University students Performance. A Case Study of MMTU and EBKUST- Port Loko Campus First-Year students in Sierra Leone

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Abstract

The study investigates the impact of examination malpractice in WASSCE mathematics on the academic performance of first-year university students at Ernest Bai Koroma University of Science and Technology Port Loko campus and Milton Margai Technical University, Sierra Leone. Employing a mixed-methods approach, data were collected through surveys, document analysis, and interviews with lecturers, encompassing a sample of 400 students and four instructors. Findings reveal a high prevalence of malpractice, with 70% of students participating directly or observing during WASSCE. Analysis indicates a significant positive correlation between WASSCE performance and university mathematics success ($r = 0.52$, $p < 0.001$), while participation in malpractice is strongly associated with higher failure rates ($\chi^2 = 25.6$, $p < 0.001$). Despite comparable secondary school achievement levels across institutions, malpractice remains widespread, potentially undermining assessment validity and long-term student preparedness. The study underscores the urgent need for enhanced examination security, academic integrity initiatives, and targeted academic support to improve tertiary outcomes and uphold the credibility of Sierra Leone's education system.

Key Words: Examination, Malpractice, Student Performance, Impact, Mathematics

1. Introduction

Education is universally acknowledged as a pivotal driver of national development, serving as a foundation for economic growth, social progress, and individual empowerment. Central to this process are examinations, which function as vital tools for assessing learners' knowledge, skills, and readiness for further education or employment (Adams & Brown, 2020). In Sierra Leone, the West African Senior School Certificate Examination (WASSCE) is the principal standardized assessment that determines access to higher education and employment opportunities. Mathematics, as a compulsory and fundamental subject across various disciplines, remains one of the most critical yet challenging areas of study, often influencing students' overall academic trajectories (Kamara & Sesay, 2021).

However, recent years have seen a concerning rise in examination malpractice, which threatens the credibility of WASSCE mathematics results. Malpractice practices such as collusion, impersonation, question leakage, and the use of unauthorized materials compromise the fairness and integrity of the assessment process (Johnson & Akinyele, 2022). While these unethical behaviors may help students secure the necessary grades for university admission in the short term, they often have detrimental long-term consequences. Graduates who have attained their qualifications through malpractice may find themselves ill-prepared for the complexities of tertiary education and professional life, thereby undermining the quality of Sierra Leone's higher education system (Fofanah & Conteh, 2023).

This study investigates the extent to which malpractice in WASSCE mathematics influences the academic performance of first-year university students, focusing on institutions such as Milton Margai Technical University, and Ernest Bai Koroma University of Science and Technology Port Loko campus (EBKUST). By examining this relationship, the research aims to contribute valuable insights toward strengthening the integrity of Sierra Leone's education system and ensuring that assessments accurately reflect students' competencies.

The specific objectives of this research include: (1) identifying the types and prevalence of examination malpractice in WASSCE mathematics among students admitted to MMTU and EBKUST; (2) evaluating the academic performance of these students in mathematics-related courses during their first year; (3) analyzing the correlation between WASSCE malpractice and university academic outcomes; and (4) proposing strategies to reduce malpractice and enhance student preparedness for tertiary education.

3. Methodology

The study integrate both quantitative and qualitative strategies. The quantitative aspect concentrated on survey responses and academic performance data, while the qualitative component involved conducting interviews with lecturers. This integrated approach facilitated a comprehensive understanding by capturing statistical trends alongside personal insights and experiences.

A purposive and stratified random sampling technique was applied to select a sample of 400 first year students from both institutions to ensure representation across different faculties. Also Four Lecturers responsible for teaching first-year mathematics course were selected as key informants.

Questionnaires were distributed to students to gather information regarding their experiences with WASSCE, self-reported exposure to malpractice.Document analysis was conducted on students' WASSCE mathematics grades and their corresponding first-year university performance records.Interview guides were utilized with lecturers to explore their perceptions of students' preparedness and the common challenges encountered in teaching them.

Data analysis involved descriptive statistics (means and percentages) with patterns identified and organized into categories to facilitate the interpretation of the quantitative results. Pearson Correlation, Linear regression and Chi Square tests were also performed to cross tabular variables within the data.

4. Result

4.1 Descriptive Result

Table 1: Students Demographic

Institution	**Gender**		**Total**	**%**
	Male	Female		
MMTU	100	100	200	57.5
EBKUST	130	70	200	42.5
Total	**230**	**170**	**400**	**100**

As shown in Table 1, the majority of students (57.5%) are from MMTU, with a significant proportion (42.5%) from EBKUST. Females accounted for 42.5% of the total student population, indicating a relatively balanced gender distribution. This demographic distribution suggests that the findings are representative across both institutions and genders, allowing for broader generalizations.

Table 2: Student Self-Reported Exposure to WASSCE Examination Malpractice

Exposure category	**Frequency**	**%**
Direct participants in malpractice	100	25.0
Observed malpractice (but did not participate)	180	45.0
No exposure / did not observe	120	30.0
Total	**400**	**100.0**

Table 2 reveals that a substantial number of students (45%) observed malpractice during WASSCE but did not participate, while 25% directly participated in malpractice. A notable 30% reported no exposure or did not observe malpractice. This high prevalence of exposure—either direct or observed—raises concerns about examination integrity and its potential impact on students' preparedness and subsequent academic performance.

Table 3: WASSCE Mathematics outcome grouped by institution

Institution	**Distinction** *A1–B3* *(%)*	**Credit** *C4–C6* *(%)*	**Fail** *D7–F9* *(%)*	**Total**
MMTU	20.0	50.0	30.0	100
EBKUST	15.0	55.0	30.0	100
Total	**17.5**	**52.5**	**30.0**	**100**

According to Table 3, both institutions show similar patterns: approximately 17.5% of students achieved distinctions (A1–B3), over half (52.5%) obtained credits (C4–C6), and about 30% failed (D7–F9). The comparable performance across institutions suggests that the level of mathematics achievement at WASSCE is relatively uniform. However, the relatively low proportion of students achieving distinctions indicates room for improvement in secondary education standards.

Table 4: First-year university students' mathematics course outcome by WASSCE category

WASSCE Math Category	**Passed first-year math** ≥50%	**Failed first-year math** <50%	**Students Total**
Distinction(A-B)	60	10	70
Credit (C–D)	126	84	210
Fail (E–F)	36	84	120
Total	**222**	**178**	**400**
Percentage	**55.5**	**44.5**	**100**

Table 4 indicates that students with distinctions (A–B) have a higher pass rate (approximately 86%) in first-year mathematics compared to those with credits and fails. Specifically, 60 students with distinction passed, while only 10 failed. Conversely, students with credit and fail categories show lower first-year pass rates (~60% and 30%, respectively). This trend underscores the predictive validity of WASSCE results regarding university mathematics performance.

Table 5: Malpractice exposure vs first-year mathematics outcome

Exposure category	**Students**	**Passed First-year math**	**Failed First-year math**	**Fail rate (%)**
Direct participants	100	30	70	70.0
Did not participate	180	110	70	38.9
No exposure	120	82	38	31.7
Total	**400**	**222**	**178**	**44.5**

Table 5 demonstrates a stark contrast in first-year mathematics success between students who participated in malpractice and those who did not. Students who directly participated in malpractice had a 70% failure rate, significantly higher than the 38.9% failure rate among those who observed malpractice or had no exposure. The chi-square test ($\chi^2 = 25.6$, $p < 0.001$) confirms a statistically significant association between malpractice participation and poorer academic performance. This suggests that engagement in malpractice may undermine students' understanding and preparedness, adversely affecting their university performance.

Table 6: WASSCE Category vs. Malpractice Exposure

WASSCE category	**Participant**	**Observed**	**No exposure**	**Total**
Distinction (70)	10	40	20	70
Credit (210)	60	90	60	210
Fail (120)	30	50	40	120
Total	**100**	**180**	**120**	**400**

Table 6 shows that students with higher WASSCE categories (distinction and credit) tend to participate more in malpractice (10 and 60 students, respectively) than those in the fail category (30 students). Conversely, the number of students who observed malpractice is higher across all categories, indicating that malpractice is widespread regardless of performance level. These patterns highlight that exposure to malpractice is common and not confined to lower achievers alone.

4.2 StatisticsTest Result

Table 7: Summary statistics result

Test	**Result**
Over all first-year math pass rate	222 / 400 = 55.5%
Pearson correlation • WASSCE numeric -- first-year score	r = 0.52 (p < 0.001)
Linear regression • First-year score % -- WASSCE category numeric	β (per WASSCE category) = +8.0; $R^2 \approx 0.27$
Chi-square • Malpractice exposure vs first-year pass/fail	$\chi^2 = 25.6$, p < 0.001

The overall pass rate in first-year mathematics is 55.5%, as summarized in Table 7. The Pearson correlation coefficient (r = 0.52, p < 0.001) indicates a moderate positive relationship between WASSCE scores and first-year scores, implying that higher secondary school achievement generally predicts better university performance. The linear regression analysis further supports this, with each increase in WASSCE category associated with an approximate 8% increase in first-year mathematics score ($R^2 \approx 0.27$), meaning WASSCE results explain about 27% of the variance in university performance.

The chi-square test reinforces the earlier findings, revealing a significant association between malpractice exposure and first-year pass/fail outcomes ($\chi^2 = 25.6$, p < 0.001). Students involved in malpractice are more likely to fail their first-year mathematics courses.

4.3 Lecturer's Perceptions on Students' Preparedness and Teaching Challenges in Mathematics

4.3.1. Perceptions of Students' Preparedness

- Lecturers frequently observe that first-year students arrive with diverse levels of foundational mathematical knowledge.
- Some students are well-prepared, having engaged thoroughly with high school mathematics, whereas others display significant gaps, especially in algebra, calculus, or problem-solving skills.
- There is a common perception that many students lack essential mathematical reasoning skills, which hampers their ability to understand and master more advanced concepts.

4.3.2. Common Challenges in Teaching Mathematics

- A prevalent challenge is student anxiety, which can hinder learning, lead to avoidance behaviors, and decrease overall engagement.
- Many students do not allocate sufficient time outside of lectures for practicing problem-solving, negatively impacting their comprehension and retention.
- Language barriers also affect some students' understanding of mathematical terminology and instructions.
- Overly dense syllabi and rapid curriculum changes can overwhelm students, making it difficult for lecturers to cover content effectively.
- Academic malpractice; such as copying, cheating during assessments, pose serious threats to the integrity of the learning process.

4.3.3. Malpractice Exposure

- Lecturers express concern that malpractice activities, including collusion and cheating, distort the true assessment of student abilities.
- Such misconduct may reflect underlying issues like lack of engagement, inadequate preparedness, or low motivation.
- Combating malpractice requires a balanced approach involving strict enforcement, ethical education, and support systems that promote academic integrity.

4.3.4. First-Year Pass/Fail Policies

- Some institutions adopt policies that aim to enhance student retention by offering simplified pass/fail assessments in mathematics.
- While these measures can reduce student anxiety

5. Conclusion

- There is a clear positive correlation between WASSCE performance and university mathematics success.
- Malpractice exposure, especially direct participation, is significantly associated with higher failure rates.
- Despite similar WASSCE performance levels across institutions, malpractice prevalence remains high, suggesting systemic issues in examination conduct.
- The findings emphasize the importance of academic integrity and the potential negative impact of malpractice on students' academic trajectories.

These results highlight the need for stricter examination security measures and enhanced preparatory support for students, particularly those involved in malpractice. Improving secondary education standards and fostering academic integrity could help improve overall student performance and reduce reliance on malpractice.

Universities might consider targeted interventions for students with lower WASSCE scores to bolster their foundation in mathematics, thereby enhancing their success in higher education.

6. References

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