

Effect of artisanal gold mining on boys' school attendance in public day secondary schools in Kakamega County, Kenya

Leonard Latan Imbosa¹

Eunice K. Majanga²

Philip Mukonyi³

¹latan300@gmail.com

²majanga04@gmail.com

³pmukonyi@mmust.ac.ke

^{1,2,3} Masinde Muliro University of Science and Technology, Kenya

<https://doi.org/10.51867/ajernet.7.4.82>

ABSTRACT

Artisanal gold mining (AGM) has had a profound effect on the socioeconomic landscape of Kakamega County. Its impact on boys' education has raised concern due to reports that boys in Kakamega County are lagging behind academically. This study therefore explored the effect of AGM on boys' school attendance in public day secondary schools. Economic Pressure Theory guided the study. The study employed a convergent parallel mixed methods research design with a correlational component. The target population comprised 2,270 respondents. The sample of 508 comprised 322 students involved in AGM and 32 not involved in AGM, 18 class teachers, 18 directors of studies, 18 deputy principals, 32 parents, 24 mining officials, 32 village elders, 8 ward administrators, and 4 Quality Assurance and Standards Officers. Purposive, proportional, stratified, and simple random sampling techniques were used. Data were collected using questionnaires, interview schedules, a document analysis guide, and focus group discussions. Quantitative data were analyzed using descriptive and inferential statistics, and qualitative data were analyzed thematically. Piloting, test-retest, expert review, and triangulation were used to determine the reliability and validity of the instrument. The reliability coefficient of 0.8 was deemed adequate. The study found that 75.8% of boys missed school to participate in AGM and 70.8% missed their examinations. The documentary evidence revealed that the number of students who dropped out due to AGM increased from 3 in 2022 to 35 in 2025. The study found that AGM was linked to disrupted school attendance. Therefore, the study recommended specific policy guidelines, stronger enforcement to curb the involvement of underage boys in mining areas, and community sensitization campaigns through administrators and education stakeholders.

Keywords: Artisanal Gold Mining, Kakamega County, Kenya, Secondary schools, School Attendance

I. INTRODUCTION

In rural communities, the socio-economic fabric has been changed due to the expansion of the artisanal gold mining (AGM) sector. AGM can generate income in rural communities; however, it can also lead to educational exclusion, absenteeism, and dropout (Machariah et al., 2020; Nyakan, 2019). Education was often regarded as a second priority in vulnerable rural households, as the opportunity cost of education was often high, leading to a strategic reallocation of domestic labour in such households where young boys were either withdrawn from school or not sent to school to fill the gaps in declining household incomes (Chege & Likoye, 2015). Artisanal and small-scale mining activities have distinct regional characteristics. Fritz et al. (2018) reported that the sector expanded as mineral prices increased and people sought alternatives to agricultural work. Mining may be able to fill gaps in inadequate family income, particularly in the absence of other opportunities. Before looking at evidence on the potential for competition between boys' engagement in AGM and school attendance, it is important to consider these livelihood pressures.

The indirect economic influence of the AGM sector in Sub-Saharan Africa presents a direct, structural challenge to achieving universal secondary education for male learners through State-led initiatives. Thousands of school-age boys in Eastern Cameroon risked their physical survival and future socio-economic development by working in makeshift AGM pits. They paradoxically sold their gold yields at extremely exploitative rates in the local market, to the direct detriment of their schooling (Bakia, 2015). The same structural diversion of male human capital was strongly apparent in the Democratic Republic of Congo (DRC), where artisanal mines were found in eastern provinces, and mapping data clearly showed over 427,469 active artisanal miners to be in operation in these provinces alone (International Peace Information Service [IPIS], 2020).

In East Africa, the full cost of the mining boom on boys was also very apparent and quantifiable. Tanzania is one of the foremost gold producers on the continent; it had a diverse range of large-scale mining concessions and informal small-scale miners working in the locations of Geita, Shinyanga and Mbeya. However, empirical research with child labourers in these enclaves revealed that boys at the age of 8 were, on average, routinely recruited by the promise

of quick money into small-scale mines and were immediately pulled out of school (Human Rights Watch [HRW], 2013). In the socio-educational context of Kenya, AGM activities have been reported from western Kenya (Migori, Kakamega and Vihiga counties). Nyakan (2019) reported that distance to gold mines appeared to have an impact on boy child retention and transition from primary to secondary schools in Rongo Sub-County, Migori County. Environmental pollution and exposure to heavy metals resulting from the informal gold mining activities in Kakamega and Vihiga counties presented the possibility of adverse health effects on informal miners and their families, including children (Ondayo et al., 2023). These education and health issues further warrant looking into the participation of boys in AGM.

Low enrolment of boys in secondary education was part of a broader and disturbing problem in the world. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2024) reports that boys are still struggling with access to education globally with an estimated 128 million boys out of school as opposed to girls who are at 122 million. Although Kenya has formally introduced the Free Day Secondary Education (FDSE) policy, which aims to remove economic obstacles to school access, significant portions of the youth population (especially school-age children) were not in school, and studies identified factors leading to dropouts and educational wastage (Atambo et al., 2016; Orwasa & Orodho, 2018). The national attendance rate of pupils in primary school was 88.6% on the day of school visits in 2012 in the Uwezo Kenya assessment. This does not measure whether students are attending secondary school and provides wider context. Out of this, there arose important structural concerns over the effectiveness of systems supporting boys, as children, in the educational ecosystem.

Studies conducted in Kakamega East and Kakamega Central showed that one of the issues highlighted in public secondary schools included issues of quality monitoring and Kenya Certificate of Secondary Education (KCSE) performance (Lumosi & Mukonyi, 2015). Further studies carried out in Rongo also found that challenges to boys remaining in school and transitioning to secondary school were linked to distance from gold mines (Nyakan, 2019). This led to the need for an in-depth empirical assessment of the impact of artisanal gold mining on school attendance of boys in public day secondary schools in Kakamega County, Kenya.

1.1 Statement of the Problem

Although policies have been put in place to ensure access to education for all, there are still concerns about boys disengaging from schools in Kakamega, as evidenced by studies that have linked dropout to household, school, and labor-related factors (Inganga, 2012). Findings from Rongo also show the impact of gold mines on boys' retention and transition to secondary school. This indicates that the lure of immediate cash returns from AGM may be affecting schooling. If left unaddressed, this educational wastage risks perpetuating poverty across future generations of boys, increasing gender disparities and local crime, and wasting public educational investments.

Although there was extensive literature on the socio-economic and environmental impacts of artisanal gold mining globally and regionally, there was limited localized empirical evidence. The direct impact of AGM on school attendance and learning outcomes among boys in Kakamega County had not been adequately identified and quantified by existing studies. Additionally, existing studies did not provide precise empirical statistical information on the scale of boys' physical engagement in mining operations and its correlational effects on educational participation measures. This methodological and contextual gap leaves educational stakeholders without data-driven strategic interventions to the AGM challenge. Therefore, this study sought to establish the effect of artisanal gold mining on boys' school attendance in public day secondary schools in Kakamega County, Kenya.

1.2 Research Objective

To establish the effect of artisanal gold mining on boys' school attendance in public day secondary schools in Kakamega County, Kenya.

1.3 Research Question

What is the effect of artisanal gold mining on boys' school attendance in public day secondary schools in Kakamega County?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Economic Pressure Theory

The theory is generally associated with Robert K. Merton's strain theory (1938), which states that economic and social pressures can push people towards alternative or deviant means of achieving socially valued goals. In this context, when families face economic hardships, boys may face pressure to contribute income through mining, which can compete with their school attendance. In development economics, the Economic Pressure Theory relies directly on the formalization of the Luxury Axiom. This structural model proposes that families only send their children to work when their household survival is threatened by severe income shocks (Basu & Van, 1998).

The Economic Pressure Theory offers a fundamental macro-economic and micro-economic analysis of the underlying system dynamics of child labour, suggesting that child labour is primarily a household coping strategy used to counteract absolute poverty and constraints in capital markets (Basu, 1999; Fors, 2012). If extreme liquidity constraints mean that the primary adult income of a household has dropped below the subsistence level or has been hit by an agricultural or environmental shock, the family faces acute constraints on liquidity (Jacoby & Skoufias, 1997). Without institutional social insurance or a viable credit market, a child's earning power today is more important than the delayed future earnings benefits of formal schooling. In this conceptual framework, poverty is treated as a direct, structural determinant which pushes families to use human resources as an income smoothing mechanism to meet current caloric and material demands (Edmonds, 2007; Fors, 2012). These microeconomic calculations are especially relevant in artisanal gold mining (AGM) environments. Boys are often viewed as potential economic contributors who can perform the physically demanding work of digging pits, crushing ore, and panning for gold.

The boys in this study region may feel more obligated due to the masculine role bestowed on them culturally. In response to adult unemployment or low agricultural wages, the theory introduces the concept of 'household survival strategies,' which involves the incorporation of the boys into the informal mining labour market and counting on household incomes that become subject to volatile conditions. This imperative places harsh countervailing pressures in the education sector: there is a high rate of chronic school absenteeism among young boys, and teenage girls and boys discontinue schooling to earn money to help pay tuition fees (or, paradoxically, to finance their own education) when parents can no longer afford the education cost (Fors, 2012). Finally, this combines economic pressure with the intergenerational transmission of poverty. Focusing on the gains from mining instead of attending school leaves the boy child without human capital accumulation, reducing his learning capability and literacy rate, and therefore his lifetime earnings (Basu, 1999; Emerson & Souza, 2003).

2.2 Empirical Review

International evidence shows that seasonal livelihood activities and child labour can negatively affect school attendance. Sharma and Dangal (2019) found that the seasonal migration of child labourers to brick kilns leads to on-going school absences, poor school performance and increased school dropout. The context is brick making and not AGM; however, the methodology and findings are relevant in that they illustrate how it is possible for seasonal economic activity and formal school enrollment to co-exist. The methodologic limitation is related to contextual transfers. However, the relative impact of gold mining is not necessarily evident in the brick kiln studies due to the varying intensities, locations, hazards and seasonal extent of mining. Based on evidence from Ethiopia, Boyden et al. (2019) argue that working in the family enterprises hinders regular school attendance and concentration. Again, the evidence helps to shed light on general child labour but fails to distinguish AGM participation among school-going boys in mining communities.

Kocsis and Molnár (2025) highlight personal aspects, education support, and access to funds with regard to dropouts and accomplishments. Their higher education research helps increase knowledge of dropout and attainment rates but does not establish the causal link between mining involvement and higher education outcomes. The methodological gap thus is the lack of a direct school-based measure of AGM participation and frequency of absenteeism and educational outcomes. African evidence links mining and other child-labor activities with absenteeism, fatigue, truancy and dropout. In Tanzania, Ouma et al. (2017) identified absenteeism among factors associated with dropout in mining communities, while Kitambazi and Lyamuya (2022) found fatigue, missed tests and truancy among children engaged in labor. These findings indicate that attendance should not be reduced to permanent dropout; irregular attendance can be an earlier mechanism through which mining undermines learning.

Methodologically, several African studies are cross-sectional, descriptive or based on non-probability sampling. Such designs are useful for describing conditions but are weaker for establishing temporal or causal relationships. The present study therefore focuses on school-going boys and examines attendance as an outcome of participation in AGM, while also considering the role of peer influence and economic pressure.

Nyakan (2019) examined the influence of AGM on boys' transition from primary to secondary school in Rongo Sub-County. The study adopted a descriptive research design and targeted 4,963 people comprising 89 head teachers, 356 class teachers and 4,518 boys. It reported that 159 respondents, representing 99.38 per cent of those responding to the relevant item, indicated that proximity to gold mines affected boys' retention and transition. The large target population strengthened coverage, but the descriptive design and reliance on respondents' perceptions limit causal interpretation and do not establish the actual frequency of boys' participation in mining.

Azumah et al. (2021) examined illegal AGM operations and school dropout using 102 quantitative participants and 20 purposively selected key informants. The mixed-method orientation is a strength because it combines quantitative and qualitative evidence, but the relatively small quantitative sample and purposive qualitative sampling limit generalizability. The study also requires chronological updating, particularly where mining and schooling conditions have changed. Atambo et al. (2016), Wamichwe et al. (2017), Muyaka et al. (2023), Kamanja (2012) and Kisiangani (2021) identify household income, labor demands, parental education, distance, school costs, peer pressure and other

social factors affecting boys' attendance or retention. Their methodological contribution is the identification of multiple predictors, but they do not isolate AGM as the independent variable. Thus, the present study fills an activity-specific gap.

Inganga (2012) examined factors influencing boys' dropout in Kakamega Central District. The study identified socioeconomic status, family income, occupation, literacy, family size and poverty as important family factors, while poor achievement, teachers' attitudes, workload and extra levies were identified as school-related factors. Activities around the school and home were also found to attract boys into cheap labor. The study is important for the local context but is more than a decade old and was concerned with primary school dropout rather than boys in public day secondary schools participating in AGM. Wasike et al. (2020) examined socioeconomic factors and KCSE achievement of boys in Kakamega North Sub-County and found strong relationships involving socioeconomic factors, parental involvement and school-based factors. The study provides local quantitative evidence, but it does not isolate AGM participation or attendance as a pathway to achievement. The source material therefore identifies a knowledge gap concerning AGM participation and an economic pressure explanation of attendance. The Kakamega methodological gap is consequently the absence of a current study using boys in public day secondary schools as the primary unit of analysis and directly measuring how AGM participation affects attendance. The present study responds by examining attendance within the specific context of mining and by considering peer influence and economic pressure as explanatory factors.

III. METHODOLOGY

3.1 Research Design

The study used a convergent parallel mixed-methods design. This design involves the simultaneous gathering of both quantitative and qualitative data and then combining the data in the subsequent analysis phase (Creswell, 2014). This combination of alternating data types, that is between numerical and non-numerical, gave a more complete and richer understanding of the research problem than employing one data type. The qualitative data were particularly useful for providing descriptions of the 'how' and 'why' of the 'what' of the quantitative results (Kothari & Garg, 2014).

Additionally, a correlational research component was incorporated into the design. Correlational analysis examines the association between measured variables (Goodwin, 2005). This approach was well-suited for the study, as the researcher sought to examine the relationship between boys' participation in artisanal gold mining and their school attendance in Kakamega County. Boys' participation in AGM was the independent variable, and school attendance was the dependent variable. Attendance indicators included missing school, skipping classes, missed examinations, tardiness, partial attendance, and dropout. The analysis of annual dropout counts examined change over time rather than directly estimating the effect of individual mining participation.

3.2 Study Area

The study was conducted in Kakamega East, Kakamega South, Kakamega Central, and Khwisero sub-counties of Kakamega County. The four sub-counties were purposively selected because they had substantial gold mining activities and public day secondary schools near active mining sites.

3.3 Target Population

The reported respondent population comprised 2,270 people as shown in Table 1. These included 2,062 boys, 36 deputy principals, 36 directors of studies, 36 class teachers, 32 parents, 32 village elders, 24 mining officials, 8 ward administrators, and 4 Quality Assurance and Standards Officers. The institutional sampling frame comprised 36 eligible schools. The student frame of 2,062 boys was identified across the 18 selected schools; the school and student frames therefore represent different sampling stages.

3.4 Sampling Techniques and Sample Size

Purposive sampling was used to select respondents most likely to yield appropriate and useful information (Kelly, 2010). Following the identification of 36 day secondary schools near active gold mines, proportional allocation across the four sub-counties was used to select 18 schools, representing 50% of the eligible schools. The institutional sample reflected practical financial and time limitations. This allocation was followed by simple random selection within each sub-county. Finally, simple random sampling via the lottery method, as outlined by Kothari and Garg (2023), was carried out within each sub-county. Uniformly folding identical slips of paper and thoroughly shaking the containers ensured that each eligible school had an equal probability of selection within its sub-county. This procedure reduced researcher selection bias in the choice of schools; purposive selection of mining areas and respondents limited the generalizability of the findings.

From the 2,062 boys across the 18 sampled schools, 322 boys directly involved in AGM were purposively selected, as shown in Table 1. To identify eligible boys directly involved in gold mining, the researcher and research assistants collaborated with the respective school administrators to identify the Form Three and Form Four boys within

each institution. The students were then screened for self-reported AGM participation through an informed consent protocol. The 322 boys constituted the reported purposive student sample, selected on the basis of eligibility and AGM participation. Apart from students, other respondents from schools included 18 deputy principals, 18 directors of studies and 18 class teachers who were purposively sampled. Similarly, purposive sampling was employed in the selection of the Village Elders, Ward administrators and the Quality Assurance and Standards Officers (QASO) while stratified purposive sampling was utilized to identify mining officials. From each school, the study included one deputy principal, one director of studies, and one class teacher selected through purposive sampling. An additional 32 students not involved in AGM were selected through stratified random sampling for four focus group discussions of eight students, one in each sub-county. Parents and village elders participated in four focus groups of eight per respondent category. The final sample comprised 508 respondents, as shown in Table 1.

Table 1
Sampling Frame

Respondent Category	Target population	Sample size	Sampling technique
Deputy Principal (1 per sampled school)	36	18	Purposive
Director of Studies (1 per sampled school)	36	18	Purposive
Class teachers (1 per sampled school)	36	18	Purposive
Directly involved students	2,062	322	Purposive
Other students (4 FGDs of 8 students each in the 4 Sub-Counties)		32	Stratified/Random
Parents (4 FGD of 8 parents each in the 4 Sub-Counties)	32	32	Stratified/purposive
QASO (4 QASOs in the 4 Sub-Counties)	4	4	Purposive
Village Elders (4 FGDs of 8 Village Elders each in the 4 Sub-Counties)	32	32	Stratified/purposive
Ward Administrators (2 per Ward with active Artisanal Gold Mining Activities in the 4 Sub-Counties)	8	8	Stratified/purposive
Mining officials (3 officials in 2 active mining sites in 4 Sub-Counties)	24	24	Stratified/purposive
Total	2,270	508	

3.5 Pilot Study

Creswell (2014) describes the pilot study as a pretest study, a small experiment designed to test logistics and gather information prior to a larger study to improve the latter's quality and efficiency. The four pilot schools in Kakamega County were excluded from the main study because they had already encountered the data collection tools. Likewise, a pilot interview was undertaken with community leaders and mining authorities near a mining site in one of the four sub-counties.

3.6 Validity of the Research Instruments

Validity refers to the extent to which the instrument measures what it is intended to measure (Kothari & Garg, 2014). Both content and construct validity were used in the study. Content validity is the degree of representing the content of the object of study and the learning objectives to be achieved by the measurement instrument. In this study, the content validity of the instruments was ascertained by experts from the Department of Educational Foundations. Their comments were used to improve the use of the research tools.

Construct validity concerns whether the test measures the intended theoretical concept (Goodwin, 2005). The indicators and measurements were then carefully formulated and informed by relevant existing knowledge in order to achieve this. From the pre-test, the researcher could also determine the need for necessary corrections in the instruments and check the answers to consider the complexity of the questions. Following this, amendments to the instruments were made to enhance the instruments' quality and validity. To determine their validity, the researcher sought and used input from the supervisors.

3.7 Reliability of the Research Instruments

Mugenda and Mugenda (1999) stated that reliability of a research instrument indicates the consistency of the instrument or data obtained from it whenever it is tried out repeatedly in the study. Based on the above statement, Orodho (2009) noted that reliability of an instrument is the consistency of measurements over repeated uses that take place over time. There are three techniques to establish reliability of an instrument including test-retest reliability, split-half reliability, and inter-rater agreement or internal consistency. A reliability coefficient can range from 0.0 to 1.00. The higher the coefficient (closer to 1.00), the more reliable the instrument; 0.0 would show no reliability. Gliem and Gliem

(2003) discussed the interpretation of internal consistency coefficients, including 0.7 as an acceptable level. The present study assessed stability through test-retest correlation.

Two (2) teachers, two (2) deputy principals and two (2) students were used to pilot test the semi-structured questionnaires to operationalize the test-retest strategy. These instruments were administered to the pilot group twice, with a two-week interval to minimize testing effects and control for maturation. The reliability coefficient value of 0.70 was used as the threshold of acceptable statistical reliability. The attained correlation coefficient of 0.8 exceeded this threshold and supported the use of the instruments in the data collection as the data collected had the necessary consistency for the more in-depth empirical analysis.

3.8 Data Collection Instruments and Procedures

The researcher requested permission via the Directorate of Postgraduate Studies (DPGS), Masinde Muliro University of Science and Technology (MMUST), from the National Commission for Science, Technology and Innovation (NACOSTI). After being issued the research permit by NACOSTI, the researcher communicated with the Regional Directors of Education, Western. The researcher also obtained mobile phone numbers of the Deputy Principals of the schools sampled from the County Director of Education (CDE)'s office and then called and briefed the deputy principals on the proposed research.

Data were collected using questionnaires, interview schedules, a document analysis guide, and focus group discussions. These instruments provided students' reports, school and community respondents' accounts, and documentary evidence on attendance and dropout. The annual dropout records covered 2022 to 2025. Parents were requested to inform the researchers about children's consent to participate in the study, and principals were asked to schedule when to collect data. The researcher respected the rights of the participants to be informed about the study; they could freely decide whether they wished to participate in the study or withdraw from the study at any time without any punishment.

Using the same guide with 5–8 open-ended questions for consistency across the sampled schools, the researcher led the discussion and a note-taker recorded group dynamics. Each discussion session took place in a private setting, with parent consent obtained in advance, for between 60 and 90 minutes. Finally, the audio recordings were transcribed verbatim. Thematic content analysis was conducted and a matrix was used for sub-county contrast and cross-tabulation of the region's commonalities to reflect the differences (Mugenda & Mugenda, 2003).

3.9 Data Analysis

The collected data from the field were checked for completeness and accuracy. A 100% response rate was achieved because the researcher and research assistants administered the questionnaires in person, addressed ambiguities immediately, and collected the completed forms on-site. Response rates should be considered alongside the sampling procedures when interpreting survey findings (Fincham, 2008). Quantitative data were analyzed using descriptive and inferential statistics with the aid of Statistical Package for the Social Sciences (SPSS) version 28. The descriptive statistics used were frequencies, averages, percentages, and ratios and were presented in tables. Pearson correlation and simple linear regression were used to describe the relationship between study year and annual AGM-related dropout cases. This time trend was distinguished from the reported relationship between mining participation and attendance indicators. Qualitative data from the field were analyzed thematically according to themes.

3.10 Ethical Considerations

Ethical considerations are vital for any research study. In this study, the researcher sought to protect the rights of all the respondents in the study by observing and upholding ethics during the data collection process. Since teenagers were involved in the study, the researcher sought and obtained informed consent from the boys and their parents (through the principals), teachers, mining officials, QASO, parents, Village Elders and Ward Administrators for data collection. The respondents were informed that the study was purely for academic purposes, that they were free to decide whether to participate or not and that they had the right to withdraw from the study at any time without penalty. The researcher explained to the mine supervisors the benefits of the study to the community, without interfering with the interests of the gold miners. The researcher conducted sufficient public participation prior to data collection to secure the trust of the miners.

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Boys' AGM Participation and School Attendance

The findings reveal a strong association between artisanal gold mining and reduced school attendance. The most emphatic result was that 59.3% of students strongly agreed and 16.5% agreed that they miss school to participate in artisanal gold mining, a combined agreement rate of 75.8%. Similarly, 55.6% strongly agreed and 14.6% agreed that

they skip classes to go mining (combined 70.2%); 58.1% agreed that they were absent from school due to mining activities, while 52.5% strongly agreed and 18.3% agreed that they have missed examinations due to mining (combined 70.8%). Class tardiness was also widespread, with 67.4% (SA+A) reporting that mining causes them to come to school late. The percentage of boys who almost dropped out of school because of mining activities was 50.3% (agreed and strongly agreed). The data collectively confirmed that schoolboys in Kakamega County public day secondary schools engaged in artisanal gold mining. Consequently, AGM disrupted attendance regularity, punctuality, and examination participation.

4.1.2 AGM and Attendance Indicators Reported by School Respondents

Table 2

Effect of AGM on School Attendance: Combined Agreement Rates (SA + A)

Attendance Indicator	Students (n = 322)	Deputy Principals (n = 18)	Class Teachers (n = 18, mean/5)
Miss school / fail to report due to AGM	75.8%	100.0%	4.28
Skip classes to go mining	70.2%	—	—
Absent from school due to mining	58.1%	—	—
Missed examinations due to mining	70.8%	—	—
Come to school late (tardiness)	67.4%	—	—
Almost dropped out due to mining	50.3%	—	—
Prefer income-generating activity over school	—	94.5%	4.28
Unable to resist temptation of AGM	—	88.9%	4.11
Peers influence students to go for AGM	—	88.9%	4.11

The results in Table 2 suggest that students' and deputy principals' ratings closely align: 75.8% of students report that they miss school because of AGM and 100.0% of Deputy Principals rate 'students fail to report to school due to AGM' as their highest-ranked attendance item ($M = 4.90/5.00$; Mode = Strongly Agree). This is supported by integrated Likert analysis conducted among class teachers, with a mean of 4.28/5.00 on the same item. A three-source agreement (self-report, senior administrator observation, and classroom-level observation) provides triangulation for one behavioral indicator. According to class teachers, absenteeism related to AGM is not sporadic, but rather recurring: 67% indicate a systematic pattern (weekends, Mondays and Fridays, nights, holidays); 72% report irregular attendance as the most prevalent impact of AGM. However, AGM was the most frequently mentioned pull factor among the class teachers, with 61% citing AGM as the main reason for students' absence, over harsh economic conditions overall (44%), and representing a key cause of absenteeism other than poverty.

Table 3

Class Teachers' Responses on When Boys Participate in AGM (n = 18)

When Boys Participate in AGM	Frequency (f)	% of Teachers
Over the weekend	1	5.6
At night	1	5.6
Monday & Friday (start/end of week)	3	16.7
Over holidays	1	5.6
Multiple times (Common pattern)	12	66.7

Note. Percentages are based on 18 class teachers and may not total 100% because of rounding.

Teachers reported varied timing of boys' participation in AGM. As shown in Table 3, 66.7% of class teachers identified participation at multiple times as the common pattern, 16.7% specifically cited Mondays and Fridays, and 5.6% each cited weekends, nights, and holidays. This demonstrates that absenteeism associated with mining is not confined to a single period and can disrupt regular learning.

4.1.3 AGM and Other Reported Causes of Boys' Absenteeism

Table 4

Class Teachers' Responses on Causes of Absenteeism among Boys (Multiple Responses, n = 18)

Cause	Frequency	Percentage
Artisanal Gold Mining	11	61.1
Harsh economic times	8	44.4
Neglect by parents	3	16.7
Drug & substance abuse	2	11.1
Bodaboda (motorbike riding)	2	11.1
Peer pressure	2	11.1
Bull fighting	2	11.1
Sand harvesting	1	5.6
Indiscipline	1	5.6
Poverty	1	5.6
Lack of school fees	1	5.6

The study further found that the most common reason for absenteeism among boys is AGM. Artisanal Gold Mining was identified by 61% of class teachers as being the cause of absenteeism, followed by harsh economic conditions with 44%, and parental neglect with 17%. This suggests that the reasons for absenteeism are not only school-based but also extend into broader socio-economic realities. The findings indicate that boys are being influenced by the financial lure of mining; poverty and inadequate parental supervision are aggravating the issues. In this way, AGM poses an economic and educational threat.

4.1.4 AGM and Attendance Effects Reported by Community Stakeholders

Table 5

Specific Effects of Gold Mining on Boys' School Attendance (Multiple Responses)

Theme / Response	VE (n = 32)	WA (n = 8)	MO (n = 24)
High absenteeism from school	32/32 (100.0%)	8/8 (100.0%)	24/24 (100.0%)
Missing school entirely on mining days	28/32 (87.5%)	7/8 (87.5%)	22/24 (91.7%)
School dropout due to mining	23/32 (71.9%)	5/8 (62.5%)	22/24 (91.7%)
Missing lessons / partial attendance	23/32 (71.9%)	6/8 (75.0%)	20/24 (83.3%)
Frequent tardiness (coming late to school)	—	4/8 (50.0%)	18/24 (75.0%)

Note. VE = village elders; WA = ward administrators; MO = mining officials. *Multiple responses were permitted. A dash indicates that the theme was not raised by that respondent category.*

Absenteeism was universally cited (100% across all three categories) as the primary attendance consequence of gold mining. 87.5% to 91.7% of those in all categories reported missing school completely on days of actual mining rather than being late. Nearly three out of four village elders (71.9%), the majority of ward administrators (62.5%), and mining officials (91.7%) identified continued involvement in mining activities as the primary determinant of school dropouts. The significance lies in the proportion of mining officials reporting school dropout, which is 91.7%: since mining officials are operatives in the mining sector, they have a firsthand impression of which boys progress from occasional mining to permanent dropout. 71.9%–83.3% reported missing lessons or partially attending school, which is a common practice.

4.1.5 AGM-Related Dropout and Examination Non-Completion: Documentary Evidence

Table 6

Annual Dropout Cases Attributed to AGM, 2022 to 2025 (DOS Documentary Records, 18 Schools)

Year	Dropout Cases	Year-on-Year Change	Growth Rate (%)
2022	3	(baseline)	—
2023	11	+8	+266.7
2024	28	+17	+154.5
2025	35	+7	+25.0
Total	77	—	+1,066.7 (cumulative)

Note. DOS = directors of studies. *Dropout cases refer to students who permanently left school and were recorded as transitioning to full-time AGM. The annual counts total 77. Source: DOS documentary records, 2022 to 2025.*

The study's most objective quantitative evidence on retention comes from documentary records from the 18 DOS respondents. The number of cases that led to dropout due to AGM increased from 3 (2022) to 35 (2025), a total of 77 cases spanning a 4-year period. A growth rate of +1,066.7% was shown, and a strong positive time trend was indicated by a Pearson correlation between year and annual dropout cases, $r = .986$, $p = .014$. The records further indicated that 211 boys who had been officially registered as KCSE candidates were absent from school due to mining activities before they could sit for their designated examinations; of these, Lugala (27.5%) and SK1 (22.3%) recorded the highest numbers of boys leaving school for mining, accounting for 49.8% of the total, thus being the highest priority intervention sites. These records refer to boys who are not in school and those that do not appear for examination because of their involvement in AGM activities.

4.1.6 Time Trend in Annual AGM-Related Dropout Cases

A Pearson correlation test revealed that $r = .986$ between study year and number of cases of dropouts due to AGM. A simple linear regression was used to assess this relationship, with the predictor variable being the coded study year (1 for 2022, 2 for 2023, 3 for 2024, and 4 for 2025), and the outcome being the number of dropouts recorded by DOS during the year of the study. The model does not estimate the relationship between participation in AGM and attendance at school, but rather change over time.

Table 7

Simple Linear Regression of Study Year and Annual AGM-Related Dropout Cases (DOS Records, $n = 4$ Years)

Parameter	Value
Regression equation	Dropout cases = $-9.00 + 11.30 \times \text{study year}$
Slope (b_1)	11.30 (SE = 1.353)
Intercept (b_0)	-9.00
R	.986
R ² (variance explained)	.972
t (slope), df = 2	8.353, $p = .014^*$
F (1, 2)	69.78, $p = .014^*$

Note. Significant at $p < .05$. The model used four annual observations from 2022 to 2025. The estimates describe the observed time trend and should be interpreted cautiously because the series is short.

The regression indicates that study year was associated with annual dropout cases, explaining 97.2% of the year-to-year variance in the four reported counts, $F(1, 2) = 69.78$, $p = .014$. Each additional study year was associated with an increase of approximately 11 dropout cases across the 18 sampled schools. Calendar year was not a measure of mining intensity, and the model did not establish a causal effect of AGM participation on dropout.

4.2 Discussion

Three-quarters of the boys reported missing school to mine, while 70.8% reported missing examinations and 70.2% skipping classes. Deputy principals unanimously identified AGM as a major factor affecting attendance, while 72% of class teachers described irregular attendance or absenteeism as the dominant pattern. AGM was also identified by 61% of class teachers as the leading cause of boys' absenteeism, ahead of harsh economic conditions at 44%. These findings strongly agree with HRW (2013), which reported in Tanzanian mining areas that children missed school or dropped out to work in small-scale gold mines. They also agree with Omudeke and Kaziro (2023), whose study of Uganda's Tiira-Mawero mining zone found a strong negative relationship between illegal artisanal gold extraction and educational outcomes. The present study extends these findings by providing direct school-attendance indicators and documentary evidence from Kakamega.

The findings are also consistent with Kisiangani (2021), who found that child labor, poverty and drug and substance use hindered boys' school attendance in Emuhaya Sub-County. The similarity suggests that mining operates within a broader ecology of boy-child vulnerability. However, the present study identifies AGM itself as the leading reported absenteeism factor in the sampled schools, thereby moving beyond a general child-labor explanation to a mining-specific mechanism. The findings also support Kamanja (2012), who concluded that boys' secondary-school participation is affected by a combination of school and non-school factors, including household income, household characteristics and other livelihood demands, and recommended concerted action by government, schools, teachers and parents. The present study confirms this multi-factor explanation but identifies AGM as a particularly powerful local economic pull factor.

The documentary evidence provides further support. AGM-attributed dropout cases increased from 3 in 2022 to 35 in 2025, giving 77 documented cases over the four-year period. The records also reported that 211 boys registered as KCSE candidates disappeared into mining before completing examinations. These examination non-completion cases

were considered separately from the 77 dropout cases because overlap between the categories was not established. The year-to-year relationship was very strong ($r = .986$, $p = .014$). This pattern is compatible with Inganga (2012), who identified boys' dropout as a serious problem in Kakamega and observed that boys were dropping out in greater numbers than girls. The present study advances that earlier work by identifying AGM as a specific and measurable pathway contributing to boys' dropout. It also complements Muyaka et al. (2023), who found marginalization in boys' enrollment, attendance and examination candidature and recommended community, county and national interventions to re-enroll boys. The attendance findings demonstrate convergence between the present study and earlier studies at three levels. First, like HRW (2013), the study finds that mining participation is associated with absenteeism. Second, like Kamanja (2012), Kisiangani (2021), Okumu (2014) and Matage (2014), it shows that economic and household pressures shape attendance. Third, like Muyaka et al. (2023) and Inganga (2012), it demonstrates that boys are vulnerable to under-participation and dropout.

The main contribution of the current study is the integration of these strands into a mining-specific educational explanation. Considering poverty, peer pressure, child labor, and school attendance together, the findings suggest that economic pressure can push boys toward mining; peer networks normalize and reward that choice; mining schedules then disrupt attendance; and absenteeism contributes to missed content, examination absence and eventual dropout. An important difference from the earlier literature is that the present study provides a longitudinal documentary trend rather than a single cross-sectional perception. This indicates that documented dropout cases increased in the sampled schools during the study period. Nevertheless, the four-year time series is short, and the regression describes a time trend. The purposive respondent sampling and reported attendance indicators do not establish a causal effect of individual AGM participation.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Artisanal gold mining was associated with disrupted school attendance, including widespread class absence, examination non-participation, tardiness, and, in a substantial proportion of the reported cases, school dropout.

5.2 Recommendations

Relevant educational and administrative stakeholders should formulate targeted policy guidelines and enforce legal frameworks to restrict boys from mining sites, while simultaneously conducting community sensitization campaigns and coordinating unified, multi-stakeholder interventions to secure the academic future of the boys. Future studies could adopt longitudinal designs to track long-term causal links between boys' mining intensity and educational trajectories over multiple years.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

- Atambo, D. N., Mwebi, B., & Onderi, H. (2016). Factors influencing boy child retention in public day secondary education in Nyamira Sub County, Kenya. *International Journal of Novel Research in Interdisciplinary Studies*, 3(6), 69–85. <https://www.noveltyjournals.com/upload/paper/FACTORS%20INFLUENCING%20BOY-871.pdf>
- Azumah, F. D., Baah, E., & Nachinaab, J. O. (2021). Causes and effects of illegal gold mining (Galamsey) activities on school dropout and residents at the Tutuka Central Circuit in Obuasi Municipality in Ashanti Region, Ghana. *Journal of Education*, 201(3), 162–173. <https://doi.org/10.1177/0022057420905109>
- Bakia, M. (2015). *Artisanal and small-scale gold mining in East Cameroon: Policy and livelihood implications* [Doctoral dissertation, Royal Holloway, University of London]. Royal Holloway Research Portal. <https://pure.royalholloway.ac.uk/en/publications/artisanal-and-small-scale-gold-mining-in-east-cameroon-policy-and/>
- Basu, K. (1999). Child labor: Cause, consequence, and cure, with remarks on international labor standards. *Journal of Economic Literature*, 37(3), 1083–1119. <https://doi.org/10.1257/jel.37.3.1083>
- Basu, K., & Van, P. H. (1998). The economics of child labor. *American Economic Review*, 88(3), 412–427.

- Bommier, A., & Dubois, P. (2004). Rotten parents and child labor. *Journal of Political Economy*, 112(1), 240–248. <https://doi.org/10.1086/379938>
- Boyden, J., Dawes, A., Dornan, P., & Tredoux, C. (2019). *Tracing the consequences of child poverty: Evidence from the Young Lives study in Ethiopia, India, Peru and Vietnam*. Policy Press. <https://doi.org/10.2307/j.ctvkjb390>
- Chege, F., & Likoye, F. (2015). Education for all? Parents' and teachers' perceptions of the process of schoolboys becoming men in Kirinyaga and Nairobi Counties, Kenya. *Journal of International Cooperation in Education*, 17(2), 55–71. <https://cice.hiroshima-u.ac.jp/wp-content/uploads/2016/03/17-2-5.pdf>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE.
- Edmonds, E. V. (2007). Child labor. In T. P. Schultz & J. A. Strauss (Eds.), *Handbook of development economics* (Vol. 4, pp. 3607–3709). Elsevier. [https://doi.org/10.1016/S1573-4471\(07\)04057-0](https://doi.org/10.1016/S1573-4471(07)04057-0)
- Emerson, P. M., & Souza, A. P. (2003). Is there a child labor trap? Intergenerational persistence of child labor in Brazil. *Economic Development and Cultural Change*, 51(2), 375–398. <https://doi.org/10.1086/346003>
- Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the journal. *American Journal of Pharmaceutical Education*, 72(2), Article 43. <https://doi.org/10.5688/aj720243>
- Fors, H. C. (2012). Child labour: A review of recent theory and evidence with policy implications. *Journal of Economic Surveys*, 26(4), 570–593. <https://doi.org/10.1111/j.1467-6419.2010.00663.x>
- Fritz, M., McQuilken, J., Collins, N., & Weldegiorgis, F. (2018). *Global trends in artisanal and small-scale mining (ASM): A review of key numbers and issues*. International Institute for Sustainable Development. <https://www.iisd.org/sites/default/files/publications/igf-asm-global-trends.pdf>
- Gliem, J. A., & Gliem, R. R. (2003, October 8–10). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales* [Paper presentation]. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Columbus, OH, United States. <https://hdl.handle.net/1805/344>
- Goodwin, C. J. (2005). *Research in psychology: Methods and design* (4th ed.). Wiley.
- Human Rights Watch. (2013). *Toxic toil: Child labor and mercury exposure in Tanzania's small-scale gold mines*. <https://www.hrw.org/report/2013/08/28/toxic-toil/child-labor-and-mercury-exposure-tanzanias-small-scale-gold-mines>
- Inganga, I. (2012). *Factors that influence the dropout of boys in public primary schools in Kenya: Case of Kakamega Central District* [Master's thesis, University of Nairobi]. University of Nairobi Research Archive. <https://erepository.uonbi.ac.ke/items/82937082-1293-492f-8548-9fc21b3cdb2a>
- International Peace Information Service. (2020). *IPIS map DRC v5* [Interactive map]. <https://www.ipisresearch.be/mapping/webmapping/drcongo/v5/>
- Jacoby, H. G., & Skoufias, E. (1997). Risk, financial markets, and human capital in a developing country. *The Review of Economic Studies*, 64(3), 311–335. <https://doi.org/10.2307/2971716>
- Kamanja, P. W. (2012). *Factors influencing the boy-child secondary education in the rice-growing region of Kirinyaga South District, Kirinyaga County, Kenya* [Master's thesis, Kenyatta University]. Kenyatta University Institutional Repository. <https://ir-library.ku.ac.ke/items/3506ffd4-339d-4be1-9c2c-fc0b2c244ffb>
- Kelly, S. E. (2010). Qualitative interviewing techniques and styles. In I. Bourgeault, R. Dingwall, & R. De Vries (Eds.), *The SAGE handbook of qualitative methods in health research* (pp. 307–326). SAGE. <https://methods.sagepub.com/hnbk/edvol/sage-hdbk-qualitative-methods-in-health-research/chpt/qualitative-interviewing-techniques-styles>
- Kisiangani, D. M. (2021). *Social factors influencing the attendance of boy child in public secondary schools in Emuhaya Sub County, Kenya* [Master's thesis, Masinde Muliro University of Science and Technology]. MMUST Institutional Repository. <https://ir-library.mmust.ac.ke/xmlui/handle/123456789/2613>
- Kitambazi, A., & Lyamuya, R. (2022). Effects of child labour on school attendance in Muheza District, Tanzania. *East African Journal of Education Studies*, 5(4), 1–19. <https://doi.org/10.37284/eajes.5.4.954>
- Kocsis, Á., & Molnár, G. (2025). Factors influencing academic performance and dropout rates in higher education. *Oxford Review of Education*, 51(3), 414–432. <https://doi.org/10.1080/03054985.2024.2316616>
- Kothari, C. R., & Garg, G. (2014). *Research methodology: Methods and techniques* (3rd ed.). New Age International.
- Kothari, C. R., & Garg, G. (2023). *Research methodology: Methods and techniques* (5th rev. ed.). New Age International.
- Lumosi, B. A., & Mukonyi, P. W. (2015). Quality monitoring in secondary education in Kenya: A comparative analysis of public schools in Kakamega East and Kakamega Central sub-counties of Kakamega County. *International Journal of Education and Research*, 3(1), 411–420. <https://www.ijern.com/journal/2015/January-2015/34.pdf>
- Machariah, L., Aengwony, R., & Busalire, S. (2020). The effects of conflicts resulting from artisanal gold mining to the socio-economic lives of the people in Ikolomani Sub-County, Kakamega County, Kenya. *International Journal of Research and Innovation in Social Science*, 4(6), 176–182. <https://rsisinternational.org/journals/ijriss/Digital-Library/volume-4-issue-6/176-182.pdf>



- Matage, J. M. (2014). *Socio economic and school factors impacting on children's absenteeism in lower primary schools in Masaba Sub-County, Kenya* [Master's thesis, Kenyatta University]. Kenyatta University Institutional Repository. <https://ir-library.ku.ac.ke/items/53ba0338-41a6-4a81-a468-3c5bf78e349a>
- Merton, R. K. (1938). Social structure and anomie. *American Sociological Review*, 3(5), 672–682. <https://doi.org/10.2307/2084686>
- Mugenda, O. M., & Mugenda, A. G. (1999). *Research methods: Quantitative and qualitative approaches*. ACTS Press.
- Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches* (Rev. ed.). ACTS Press.
- Muyaka, J., Omuse, D. E., & Malenya, F. L. (2023). Manifestations of boys' under participation in education in Kenya: The case of Busia and Kirinyaga counties. *Compare: A Journal of Comparative and International Education*, 53(1), 89–104. <https://doi.org/10.1080/03057925.2021.1877113>
- Nyakan, A. B. (2019). Influence of gold mining on boy-child's transition rate from primary to secondary school education in Rongo Sub-County, Kenya. *Journal of Advances in Education and Philosophy*, 3(1), 26–30. <https://doi.org/10.21276/jaep.2019.3.1.4>
- Okumu, W. M. (2014). *Socio-economic factors influencing students' access to secondary school education in Rongo District, Kenya* [Master's thesis, University of Nairobi]. University of Nairobi Research Archive. <https://erepository.uonbi.ac.ke/items/4ae3c89a-d0a1-4556-a916-c413a787c060>
- Omudeke, R. I., & Kaziro, N. (2023). Investigating the effects that gold mining activities have brought on child education in Uganda: Case study Tiira Mawero Gold Mines in Busia District. *Metropolitan Journal of Social and Educational Research*, 2(9), 519–524.
- Ondayo, M. A., Watts, M. J., Hamilton, E. M., Mitchell, C., Mankelow, J., & Osano, O. (2023). Artisanal gold mining in Kakamega and Vihiga counties, Kenya: Potential human exposure and health risk. *Environmental Geochemistry and Health*, 45(8), 6543–6565. <https://doi.org/10.1007/s10653-023-01647-z>
- Orodho, J. A. (2009). *Elements of education and social science research methods*. Kanzejja Publishers.
- Orwasa, B., & Orodho, J. A. (2018). Wastage in public secondary schools: Strategies to reduce effects of home-based variables in Kericho County, Kenya. *Greener Journal of Educational Research*, 8(4), 76–84. <https://doi.org/10.15580/GJER.2018.4.060718078>
- Ouma, D. H., Ting, Z., & Peshu, J. C. (2017). Analysis of the socio-economic factors that contribute to children school dropout in artisanal small-scale gold mining communities of Tanzania. *Journal of Education and Practice*, 8(14), 71–78. <https://www.iiste.org/Journals/index.php/JEP/article/view/37017>
- Sharma, B., & Dangal, M. R. (2019). Seasonal child labour in Nepal's brick kilns: A study of its educational impact and parents' attitudes towards it. *Journal of Education and Work*, 32(6–7), 586–597. <https://doi.org/10.1080/13639080.2019.1673886>
- United Nations Educational, Scientific and Cultural Organization. (2024, June 17). *The price of inaction: The global private, fiscal and social costs of children and youth not learning*. <https://www.unesco.org/en/articles/price-inaction-global-private-fiscal-and-social-costs-children-and-youth-not-learning>
- Uwezo Kenya. (2012). *Are our children learning? Annual learning assessment report Kenya 2012*. Twaweza East Africa. <https://usawaagenda.org/wp-content/uploads/2020/05/Kenya-Report-2012-WebFinalUpdate.pdf>
- Wamichwe, J. M., Gichuhi, L., Mari, N., & Muriithi, M. (2017). The effects of home based socio-economic factors on enrollment of male student in secondary school in Kirinyaga County Central Region of Kenya. *International Academic Journal of Social Sciences and Education*, 1(5), 25–35. http://www.iajournals.org/articles/iajsse_v1_i5_25_35.pdf
- Wasike, L., Kiprop, D., & Ndaita, J. (2020). Influence of socio-economic factors on K.C.S.E performance of boy-child in Kakamega North Sub County, Kenya. *International Journal of Academic Research in Business and Social Sciences*, 10(4), 662–688. <https://doi.org/10.6007/IJARBS/v10-i4/7218>