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Digging Deeper: Understanding the Motivations and Analysing the Academic Performance and Scholastic Status of Student Miners

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Abstract—Passed on from generation to generation and rooted to their culture as well as their economic needs, the ethnolinguistic groups of Ibaloi and Kankanaey miners of the Cordilleran region learned the rudiments of small-scale mining at an early age. This study holds significant value in understanding the interplay between student miner's economic activities and their academic success. Quantitative descriptive survey was used in this study. The respondents were twenty-five enrolled Grade 11 and 12 male student miners. The gathered data was treated with descriptive statistics which include frequency counts, weighted mean, ranking and percentage. Results revealed that economic incentives and entrepreneurial motivation play a significant role in encouraging the student miners' participation in small-scale mining. It was driven by the absence of alternative livelihood or income-generating opportunities, familial expectations, cultural norms as well as social and environmental factors. Furthermore, the respondents of the study agreed that participating in small-scale mining contributes to their skill development and provides valuable hands-on experience. In terms of their academic performance, majority of the student miners performed within the "satisfactory" range, and they achieved 100% promotion rate in their scholastic status promotion and retention even though their time and attention were divided between academic responsibilities and participation in small-scale mining. In conclusion, participation in small-scale mining activities did not prevent the student miners' from advancing academically; however, the barely passing grades of some participants signify the need to provide academic assistance. These findings emphasize the need for policies and programs that create more accessible, flexible, and learner friendly employment or training for student miners.

***Index Terms*—students, academics, small-scale mining, Cordillera, Benguet.**

1. Introduction

Small scale mining refers to small groups engaged in low-cost, low-tech, labor-intensive excavation and processing of minerals. It also includes all lower segments of mining both non-mechanized and mechanized that are not conventional in industrial mining operations (Schipper, de Haan & van Dorp, 2015). These made a clear distinction between industrial and large-scale usually licensed and small-scale often unlicensed mining.

In the Philippines' mining industry has been present since the early 1900s. The mining sector evoked national attention for its potential to contribute towards economic growth, job opportunities, and poverty alleviation. The mining industry has long been one of the significant contributors to the Philippines' economy as it is richly endowed with mineral resources. The Philippines is considered the fifth most mineralized country due to high gold, nickel, copper, and chromite. In 2019, exports of metallic, non-metallic minerals and mineral products were estimated at 4.38 billion USD. The top mineral exports were copper, gold, and nickel. The significant exporters were Japan, Australia, Canada, and China. It was also reported that the mining industry provides employment opportunities. Around 190,000 workers are currently employed in the minerals industry. A total of 107.4 billion pesos is the contribution of the mining industry to GDP. Given the high economic impact of mining, Small-Scale Mining (SSM) is often informal, making it unregulated and not well documented. This phenomenon increases the likelihood that small-scale miners be exposed to more potential health risks and hazards.

A study in the Philippines showed that industries such as agriculture, manufacturing, and mining have higher hazard risks, including exposure to harmful elements combined with strenuous physical work. In the mining sector, due to tedious work and extreme environmental exposure, workers are exposed to varying degrees of hazards. Most seen in the Philippines are high levels of silica dust during ore feeding and ball/rod mill operations, exposure to hydrogen cyanide, nitric acid, carbon monoxide at concentration considered dangerous to health. The Philippine government fully supports the development of its Small-Scale Mining (SSM) industry despite the various risks since there is much potential and promise in this sector. This is manifested in the following developmental directives: enactment of specific SSM laws and regulations, including a separate set of safety rules; establishment of SSM unit within the Mines and Geoscience Bureau to support and regulate the sector; and decentralization of the issue and control of SSM permits and licenses through local government units (LGUs). Presidential Decree No. 1899 also establishes SSM as a new dimension in mineral development. Republic Act No. 7076, otherwise known as the "People's Small-Scale Mining Act of 1991," was also created for SSM programs and other

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related purposes (Lu and Lu, 2022).

It is difficult to make estimates on the number of children working in mines due to a lack of clear data on the topic and the lack of uniformed definitions on what constitutes child labor. Moreover, Artisanal and Small-Scale Mining (ASM) is informal and often illegal, thus practitioners operate in secret making research difficult. However, the International Labor Organization (ILO) estimates that there are more than one million children working in ASM, with the number increasing with the deagrarianisation of large areas in Africa and Asia.

The data on supply chains in ASM is limited and it is difficult to credibly assess when minerals involving child labor make it into Europe. Due to the informal and often illegal nature of ASM they have a longer, more complicated, supply chain where responsibility and traceability is lost along the way. However, there are a range of organizations – such as Fair trade, Fair mined, OECD, and the Responsible Jewelry Council – that offer certification that guarantees that the entire supply chain is audited and free of elements such as child labor.

Children engage in a range of tasks in ASM, however not all of them are considered dangerous and often mirror the tasks they would undertake in agriculture. This is where there is a debate between agencies such as ILO and the UN, who consider all forms of child labor in mining the worst form, and academics, who argue the case is more complex. Moreover, ILO and the UN argue that child labor in mining prevents children from going to school, while many academics argue it often enables them to afford school. Academics tend to examine the cultural and societal elements of children working more generally within the context, whereas these larger agencies use a broader Western concept of childhood when examining child labor in mining (O'Driscoll, 2017).

This research aligns with the academics' context wherein it accepts the cultural and societal elements of children working in small scale mining industry. In addition, this study is rooted in the philosophy of pragmatism, a theory which emphasizes that ideas should be judged on their practical real-world applications (Armstead, 2022). Finally, this research is supported by Maslow's Pyramid of Human Needs specifically the physiological needs. Physiological needs are the basic needs for sustaining human life. These needs include food, shelter, clothing, rest, air, water, sleep and sexual satisfaction. These basic human needs (also called biological needs) lie at the lowest level in the hierarchy of needs as they have priority over all other needs (Chavda, 2024). Students need to provide for their basic needs first before satisfying their other needs.

This study holds significant value in understanding the interplay between students' economic activities and their academic success by:

1. examining the factors that encourage students to engage in mining;
2. understanding their motivations to develop interventions to improve their educational outcomes; and,
3. investigating the academic performance and scholastic status of student miners to offer a clearer picture of how involvement in mining affects their education, particularly in terms of retention, passing rates, and graduation.

These findings are crucial for policymakers, educators, and community leaders in crafting strategies to support student miners by enhancing access to education, developing vocational alternatives, and addressing the economic pressures that lead the students to participate in SSM. Ultimately, the researchers contribute to the broader discourse on child labor, education, and sustainable development in mining communities.

2. Theoretical Review

To understand the complexity of the academic situation of student-miners, the study draws from several literature reviews:

A. Factors Encouraging Learners to Engage in Small Scale Mining Activities

Poverty is the most prominent driver of learner engagement in ASM. Families in economically vulnerable conditions often view mining as a necessary means of survival, with children and learners contributing to household incomes to meet basic needs (Hilson, 2009). In many regions, small-scale mining is one of the few available options for families struggling with economic deprivation, and learners are often expected to participate in this labor to help sustain their families (Banchirigah, 2006). Learners in small-scale mining areas often return to work after school or during vacation periods because the financial incentives of working outweigh the potential of completing their education, particularly when employment in mining provides higher short-term earnings. This was observed in Itogon, Benguet where mining is the primary industry, many learners return to mining after school or during the holidays to secure their livelihood (Faylon & Viray, 2016). The lack of employment alternatives in rural mining provinces aggravates this cycle. Despite efforts to promote education, young people in these provinces often view mining as the most accessible and immediate form of income.

Furthermore, systemic barriers such as high education costs, poor infrastructure, and limited job opportunities in rural areas worsen the issue, creating an environment were dropping out of school to work in ASM seems like a rational decision for many learners (Gylfason & Zoega, 2001). This economic necessity pushes many learners into the mining sector, where wages, although low, are often higher than what is offered in agriculture or other local industries (Hilson & Garforth, 2012).

Cultural and societal norms also play a significant role in enabling learner participation in ASM. In many mining communities, child labor is deeply entrenched and normalized, often perceived as an integral part of family and community life. This normalization is rooted in generational practices where mining is seen not only as a means of livelihood but also as a familial duty and a shared responsibility to ensure household survival. In such contexts, parents and elders often introduce young individuals to mining activities at an early age, framing it as a rite of passage or even a family tradition (Banchirigah, 2006).

In the Cordillera region, this cultural view is especially

pronounced specially in mining communities such as Tuba and Itogon where children are taught mining techniques by their parents and older family members from a young age. In these areas, mining is more than just an economic activity; it is a cultural practice passed down through generations (Alcasid & Dela Cruz, 2017). Moreover, student miners view mining as an essential rite of passage, necessary for proving their strength and capability within their community. The widespread acceptance of ASM as part of the local culture makes it difficult to challenge or shift these practices, even though the work can be physically hazardous and detrimental to long-term health and education.

In these contexts, mining often symbolizes independence and maturity, which are valued traits in rural, resource-dependent communities. For many student miners in mining towns in the Philippines, the decision to work in ASM is influenced by both personal and societal expectations to contribute to their family's income and to engage in a respected community tradition (Faylon & Viray, 2016)

B. Academic Performance of the Learner Miners

Academic performance is typically measured through grades, assessments, and overall achievement within the school system. It reflects how well students understand, engage with, and apply the learning material. A key indicator of academic performance is the Grade Point Average (GPA), which summarizes the academic success of students (Chen, 2016). Higher GPAs correlate with better learning outcomes, engagement, and long-term academic success. Other factors that contribute to academic performance include test scores, project completion, and classroom participation (Krause & Coates, 2008).

School going students who work are adversely affected in all areas of their personality, which negatively impacts their performance and retention in school. Moreover, child labor and high dropout rates hurt school enrollment (Dabone et. al, 2023). Furthermore, child labor disrupts education by preventing pupils from performing their assignments or making them too tired to concentrate in class (Canagarajah & Coulombe, 2017). Also, in Ghanaian study briefing paper it was stated that labour hurts language and math learning (UNICEF, 2017). Finally, a Tanzanian study showed that working students spend less time studying, which affects their math and reading test performance (Akabayashi & Psacharopoulos, 2019).

The challenges of balancing work with education can significantly hinder academic performance. Studies show that working students often face difficulties managing their time, leading to poor grades and lower academic engagement (Bryant & O'Hara, 2019). For student miners, this struggle is compounded by the physical demands of their work, which can lead to exhaustion and decreased mental focus during school hours. While some researchers suggest that working students may develop time management skills that benefit them later in life the negative effects of work-related fatigue often outweigh these potential benefits, especially for students in labor intensive industries like mining.

C. Scholastic Status of the Learner Miners in Terms of Promotion and Retention Rate

Scholastic status refers to the academic standing of a student, encompassing indicators such as promotion and retention rates, graduation rates, and class attendance. Promotion and retention rates reveal how frequently students move to the next grade level or repeat a year due to academic struggles. Graduation rates measure the proportion of students who complete their education within a specific time frame. Class attendance is a critical factor, as it directly affects students' ability to learn and participate in academic activities (Gonzalez, 2017). These metrics serve as important barometers of a student's academic trajectory.

The promotion and retention rates of student miners are often adversely affected by their work schedules. Studies have shown that the retention rates in mining communities are typically higher, as students are held back for failing to meet academic requirements. While if we speak of graduation or completion rates, it was highlighted that the likelihood of completing high school is significantly lower for working students, particularly those engaged in physically demanding labor (Ainsworth et al., 2016). For student miners, the choice between continuing their education and securing financial stability often leads to early school withdrawal, contributing to their lower graduation rates (Gonzalez, 2017).

It was further stated that due to their interest in quick money, students in education ignore being in school and instead engage in small-scale gold mining activities. Engaging in mining activities is caused by the economic status of families and communities. This also leads to school dropouts, absenteeism, early marriage, and child labor (Annan et. al, 2024). In addition, this work is typically physically demanding, leading to fatigue and absences from school, both of which impact their grades and overall academic performance (Ainsworth et al., 2016). Limited resources may also affect the ability of these students to access additional educational support, further compounding their academic struggles. These findings suggest that participation in small-scale mining plays a potential hindrance to academic achievement due to physical demands and time constraints.

However, in some cases this did not prevent some students from advancing in their studies. It was noted that learners engaged in child labor often manage to meet minimum school requirements when they have strong personal motivation and family support (Chimombo, 2005). In some cases, flexible schooling programs and remedial assistance help working students cope with their academic responsibilities (Moyi, 2011).

Though the promotion rate is encouraging, it is important to interpret it cautiously. Research suggests that high promotion rates in contexts involving working students may sometimes reflect policies focused on automatic promotion rather than mastery of competencies (Hungi & Thuku, 2010). Therefore, further monitoring of actual learning outcomes and academic engagement is necessary to ensure that promotion translates into meaningful educational attainment.

The research gap can be gleaned from the lack of studies in a

specific population. While there's a lot of research to determine if and how illicit mining affected learner achievements in the other countries, there is a lack of it in the Cordilleran Region, specifically in the province of Benguet. This research gives insight to actual experience of minor miners in Benguet.

3. Methodology

A. Research Design

This study used quantitative descriptive survey. Survey research designs are procedure in quantitative research in which investigators administer a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population (Creswell, 2012). The descriptive survey gave insight to represent a picture of the motivations of learners to participate in small scale mining or artisanal scale mining. Moreover, survey research tends to be a reliable method of inquiry because surveys are standardized in that the same questions, phrase in the same way, are posed to respondents. Finally, the versatility of survey research was also an asset. Surveys are for all kinds of people in all kinds of professions, age, and status in life.

B. Population and Sampling

To identify the factors encouraging learners' participation in small-scale mining, the respondents in this study were the 25 currently enrolled Grade 11 and 12 male learner-miners at Evelio Javier Memorial National High School. Purposive sampling technique, also called judgment sampling was used. It is the deliberate choice of a participant due to the qualities the participant possesses. It is a nonrandom technique that does not need underlying theories or a set number of participants. Simply put, the researchers decide what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Etikan, 2016). Data needed to analyze the academic performance and scholastic status was be taken from the enrolled semester record of the same participants.

C. Data Collection

The data underlying the work presented in this study was collected using a structured questionnaire. The survey contains items specifically designed to carefully measure and identify the factors encouraging students to participate in artisanal and small-scale mining (ASM). To ensure the validity of the instrument, it underwent expert review by a statistician who assessed the clarity, relevance, and appropriateness of the survey items.

To establish reliability, the questionnaire was pilot tested with twenty learners during the previous school year. Based on the pilot test results, necessary adjustments were made to enhance the tool's consistency and accuracy. Reliability was statistically tested using Cronbach's Alpha, and the instrument achieved an alpha value of 0.82, indicating a high level of internal consistency among the survey items.

Following the survey administration, the academic and scholastic records of the participants was retrieved with the consent of the proper individuals and school officials. These records served as the primary reference for analyzing the promotion, retention, and graduation rates of student miners, thereby describing their academic performance and scholastic status.

D. Data Analysis

The quantitative data was gathered from the respondents and was tallied and tabulated. The data and results of the study was treated with descriptive statistics. The descriptive statistics include the frequency counts, weighted mean, ranking and percentage. In addition, a 4-point Likert Scale was used to quantify the level of agreement as perceived by the respondents as how each factor encourages them to participate in ASM.

4. Results

Results revealed the six factors that encouraged the student miners to their engage in small scale mining. First, the student miners indicated that economic incentives play a significant role in encouraging their participation in small-scale mining. This was reflected in the overall mean score of 3.045 (agree), confirming that financial considerations strongly influence their decision to engage in this activity. In addition, the student-miners perceived their involvement in small-scale mining as driven by the absence of alternative livelihood or income-generating opportunities. This factor obtained a general mean of 2.95 (agree), indicating that limited options for earning or gaining employment strongly affect their participation. Also, the student miners generally agreed that familial expectations and cultural norms contributed to their participation in small-scale mining. With an overall mean score of 2.99, these influences were perceived as significant in shaping their decision to work in mining. Moreover, data showed that social and environmental factors also have a considerable influence on student miners' engagement with an overall mean of 2.98 (agree), suggesting that the immediate community and environmental setting play a key role in encouraging mining related activities. Furthermore, student miners generally agree that participating in small-scale mining contributes to their skill development and provides valuable hands-on experience. This was supported by a general mean score of 2.89, setting it within the "agree" range. Finally, student miners agreed that entrepreneurial motivation significantly influences their participation in small-scale mining. This factor received a general mean score of 2.93, also within the "agree" range, indicating that some student miners perceived mining as an opportunity to build entrepreneurial skills and future business prospects.

On the level of the student miners' academic performance, majority of students performed within the "satisfactory" range. Of the 25 students, 1 scored within the "outstanding", 9 students achieved a "very satisfactory" (85-89), and 10 students were categorized as "satisfactory" (80-84). The remaining 5 students received a "fairly satisfactory" rating (75-79), reflecting a slightly lower level of performance. The overall academic performance of the group, as indicated by the average of 83, suggesting that their performance was generally satisfactory, with a few exceptional outliers in the higher performance range.

Regarding the scholastic status of student miners in terms of promotion and retention, the findings revealed a 100% promotion rate. Despite the demanding nature of mining as a part-time job, all 25 student miners successfully advanced to the next grade level.

5. Discussion

A. Student's Level of Agreement on the Factors Encouraging their Participation in Small-Scale Mining

All the identified factors have an influence in encouraging student miners to engage in small-scale mining. Among these influences, economic incentives emerged as the most compelling, as learners perceive small-scale mining as the easiest informal job to enter and the most viable source of income within their community. While families may not directly force them to engage in mining, the influence of peers and the prevailing community environment significantly encourage their participation.

The systemic barriers such as high education costs, poor infrastructure, and limited job opportunities in rural areas worsen the issue, creating an environment were dropping out of school to work in ASM seems like a rational decision for many learners (Gylfason & Zoega, 2001). This economic necessity pushes many learners into the mining sector, where wages, although low, are often higher than what is offered in agriculture or other local industries (Hilson & Garforth, 2012).

To sum, the involvement of learners in artisanal and small-scale mining is shaped by a complex interplay of economic, cultural, social, and systemic factors. Poverty, limited access to education, and entrenched cultural norms all contribute to the decision-making process that leads learners into the mining sector. While the financial rewards of mining may offer short-term benefits, the long-term consequences such as health risks and limited educational attainment pose significant challenges for these learners. Understanding the motivations behind learner participation in ASM is critical for developing policies and interventions aimed at reducing child labor and promoting educational opportunities in mining communities.

B. Level of the Academic Performance of the Learner Miners

The student-miners were still capable of earning passing marks despite having informal jobs outside school hours. Moreover, it can be deduced that students may even achieve outstanding marks if they perform better. On the other hand, the barely passing grades of some participants signify the need to provide academic assistance according to their situation, as their time and attention were shared between academic responsibilities and participation in small-scale mining.

The challenges of balancing work with education can significantly hinder academic performance. Studies show that working students often face difficulties managing their time, leading to poor grades and lower academic engagement (Bryant & O'Hara, 2019). For student miners, this struggle is compounded by the physical demands of their work, which can lead to exhaustion and decreased mental focus during school hours (Bryant & O'Hara, 2019). While some researchers suggest that working students may develop time-management skills that benefit them later in life the negative effects of work-related fatigue often outweigh these potential benefits, especially for students in labor-intensive industries like mining.

C. Scholastic Status of the Learner Miners in Terms of Promotion and Retention Rate

Contrary to some findings, the scholastic status of student miners in terms of promotion and retention revealed a 100% promotion rate. Despite the demanding nature of mining as a part-time job, all 25 student miners successfully advanced to the next grade. Participation in small-scale mining activities did not prevent the students from advancing in their academic journey. This result suggests that participation in small-scale mining, while often considered a potential hindrance to academic achievement due to physical demands and time constraints, did not prevent students from advancing in their studies. Similar findings were reported by Chimombo (2005), who noted that learners engaged in child labor often manage to meet minimum school requirements when they have strong personal motivation and family support. In some cases, flexible schooling programs and remedial assistance help working students cope with their academic responsibilities (Moyi, 2011).

While the promotion rate is encouraging, it is important to interpret it cautiously. Research suggests that high promotion rates in contexts involving working students may sometimes reflect policies focused on automatic promotion rather than mastery of competencies (Hungi & Thuku, 2010). Therefore, further monitoring of actual learning outcomes and academic engagement is necessary to ensure that promotion translates into meaningful educational attainment.

These findings demonstrate that student miners, with adequate school support and personal determination, can keep pace with grade-level expectations despite their dual responsibilities. This reinforces the importance of designing interventions that both protect children from excessive labor and provide flexible learning options that help them succeed academically (Guarcello et al., 2011).

6. Conclusion and Recommendations

All the identified factors have an influence in encouraging student miners to engage in small-scale mining. Among these influences, economic incentives emerged as the most compelling, as students perceive small-scale mining as the easiest informal job to enter and the most viable source of income within their community. While families may not directly force them to engage in mining, the influence of peers and the prevailing community environment significantly encourage their participation.

In addition, the student miners are still capable to earn passing marks despite having informal jobs outside school hours. Moreover, it can be deduced that students may even achieve outstanding marks if they perform better. On the other hand, the barely passing grades of the majority of participants signify the need to provide academic assistance according to their situation, as their time and attention are shared between academic responsibilities and participation in small-scale

mining. Finally, participation in small-scale mining activities does not prevent learners from advancing in their academic journey.

The findings highlight the need for the school and its stakeholders to provide proper guidance to student miners, clearly explaining the advantages and disadvantages of engaging in such work while studying. Furthermore, given that students perceive small-scale mining as a viable source of income, community agencies are encouraged to create alternative income-generating opportunities for senior high school students; options that are less physically demanding and time consuming compared to mining. Promoting alternative livelihood pathways, however, will require not only economic initiatives but also social interventions aimed at reshaping community perceptions and influencing youth aspirations.

In addition, the varied levels of academic performance among students suggest the need for localized interventions to maintain and even improve learner outcomes. These interventions should not necessarily prevent students from taking part-time jobs; rather, they should provide systematic opportunities to catch up on academic requirements that may be missed due to their participation in small-scale mining activities. Likewise, community and local agencies could consider creating clear guidelines regulating the extent, duration, and frequency of students' involvement in mining. This would ensure that while students may still engage in mining, they will not sacrifice time intended for their education.

Finally, the school should examine the factors that contributed to the 100% passing rate among student miners and implement strategies to maintain this level of success. Monitoring actual learning outcomes and academic engagement is also essential to ensure that promotion rates translate into meaningful educational attainment. Moreover, schools and stakeholders should continue providing adequate support and fostering students' personal determination so they can meet grade-level expectations despite their dual responsibilities.

A. Further Study

This study is limited to quantitative data in one specific location, further research is recommended to explore effective ways of supporting student miners from other provinces in the Philippines. There is also a need to investigate the current government programs related to small scale mining in relation to minors.

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