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Resilience and sustainability of entrepreneurial mindsets in Ghanaian youth: a five-year impact study of sports training programs

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Introduction: Youth sports programs are recognized as effective tools for fostering entrepreneurial mindsets, resilience, and sustainable personal development. This study evaluates the long-term impact of the Africa Alliance for Partnerships (AAP) program on the academic and professional trajectories of its alumni, with a focus on sustained entrepreneurial skills and personal growth.

Methods: A structured survey was conducted among alumni who participated in the AAP program at least five years prior. Data on academic performance, career development, entrepreneurial activities, and personal experiences were collected and analyzed. Quantitative data were subjected to statistical tests, including regression and correlation analyses, while qualitative feedback underwent sentiment analysis.

Results: Findings indicate significant academic performance improvements and enhanced entrepreneurial skills among participants. The average skill application scores increased consistently from 2018 to 2023, with a strong positive correlation ($r = 0.75$) between skill application and academic improvement. Sentiment analysis revealed predominantly positive feedback, underscoring participant satisfaction with the program. Gender analysis showed no significant differences in outcomes, highlighting the program's inclusivity.

Discussion: The AAP program successfully instilled entrepreneurial mindsets and resilience, sustained over five years. Key factors contributing to its success include mentorship, leadership training, and exposure to real-world challenges. These findings demonstrate the potential of sports-based youth development programs as sustainable models for fostering entrepreneurship and personal growth. Future research should explore additional external factors influencing outcomes and assess the scalability of such programs in diverse contexts.

KEYWORDS

youth development, entrepreneurial mindset, sports-based education, resilience in youth, mentorship programs, academic performance, skill application, Ghana

1 Introduction

The integration of sports into youth development programs has emerged as a powerful tool for fostering entrepreneurial mindsets among young people, especially in contexts where socio-economic challenges limit employment opportunities (Malete et al., 2022; McCole et al., 2022; Ocansey et al., 2023). Sports-based initiatives extend beyond physical fitness; they contribute significantly to holistic youth development by instilling values such as teamwork, leadership, discipline, and resilience—qualities essential for entrepreneurial success in today's complex economy (Mejía-Giraldo et al., 2024; Hammerschmidt et al., 2023). Recent studies have highlighted how these skills, nurtured through structured sports programs, help youth in navigating complex professional and entrepreneurial pathways (Ocansey et al., 2023; Mejía-Giraldo et al., 2024). Participation in sports also fosters strategic decision-making, adaptability, and risk tolerance, aligning with the key attributes of entrepreneurial mindsets (Mejía-Giraldo et al., 2024; Hammerschmidt et al., 2023).

Globally, sports-based programs are recognized for fostering crucial entrepreneurial competencies. For instance, the International Olympic Committee's Olympic Values Education Programme (OVEP) promotes critical thinking, resilience, and adaptability, which are foundational to entrepreneurial thinking [International Olympic Committee (IOC), 2017]. Similarly, the United Nations' "Sport for Development and Peace" movement, initiative underscores the transformative potential of sports in promoting social inclusion, gender equality, and economic empowerment [United Nations (UN), 2018]. These programs demonstrate that sports can catalyze personal and economic growth by instilling transferable life skills relevant in diverse professional contexts.

In Africa, where the youth population is rapidly growing, sports-based programs have become valuable interventions for youth empowerment and economic engagement. Local programs, such as Kenya's "Kicking for Change," highlight sports' ability to impart business and vocational skills, fostering economic self-sufficiency (Smith and Waddington, 2019). Ghana's "Right to Dream" Academy similarly combines sports training with academic and leadership development, equipping youth with entrepreneurial and professional competencies that support their advancement in various career fields (Darby, 2020). These initiatives underscore the effectiveness of sports as a medium for delivering education that prepares youth for real-world challenges.

In Ghana, where economic barriers remain significant, sports have been adopted as a strategic component of youth empowerment programs. The Ghanaian government and various NGOs have launched initiatives that leverage sports for skills and career development, recognizing sports' role in building entrepreneurial mindsets. Among these initiatives, the Africa Alliance for Partnerships (AAP) program is particularly notable. Established to integrate sports with education and mentorship, the AAP program helps youth cultivate entrepreneurial skills, resilience, and leadership. The program provides participants with practical experiences through structured activities, such as team-based projects, leadership challenges, and mentorship from experienced professionals. Through these activities, AAP emphasizes skill application, preparing participants for both academic and career success by fostering critical thinking, problem-solving, and a strong sense of discipline.

Despite the growing recognition of sports' potential for fostering entrepreneurial qualities, there is a significant research gap regarding how sports-based youth programs specifically contribute to resilience,

sustainability, and long-term career readiness. Few studies comprehensively examine how these programs influence youth in personal, academic, and career domains, especially in African contexts where such programs could have far-reaching impacts. Addressing this gap, the present study examines the long-term impact of the AAP program on its alumni, focusing on how their participation has influenced their academic performance, career paths, and entrepreneurial mindsets.

To investigate this, the study addresses the following research questions:

- 1 How has participation in the AAP program influenced the academic performance of its alumni?
- 2 What impact has the AAP program had on the career choices and trajectories of its participants?
- 3 To what extent have the entrepreneurial skills and mindsets fostered during the AAP program been sustained over five years?

By exploring these questions, this research contributes to the growing body of knowledge on sports-based programs as sustainable models for youth development and entrepreneurship. Findings from this study could inform the design of similar programs, providing evidence of sports' potential to empower youth in personal and professional realms.

2 Materials and methods

2.1 Study design

This study employed a cross-sectional design aimed at assessing the long-term impact of the Africa Alliance for Partnerships (AAP) program on alumni who participated in the initiative. Data were collected at a single point in time, focusing on the cumulative effects of program participation over a five-year period.

2.2 Participants and ethics approval

The target population comprised alumni aged 18–30 who had completed the AAP program at least five years prior, ensuring that the responses reflected sustained impacts rather than immediate post-program effects. Exclusion criteria included participants who were not reachable through the alumni database or who did not complete the survey.

The survey targeted alumni who participated in the AAP program at least five years prior, ensuring the data reflected the long-term impact of the program. A random sampling of alumni was conducted from the AAP alumni database to ensure diversity in age, gender, and educational backgrounds. Surveys were distributed electronically, with regular reminders sent to enhance response rates. Data was collected anonymously to ensure participant privacy and response authenticity.

Ethical clearance for the study was obtained from the Institutional Review Board (IRB) of the University of Ghana. All participants provided informed consent, with assurances of anonymity and confidentiality to encourage candid responses.

2.3 Data collection

The data for this paper was collected through a structured survey administered to alumni of the Africa Alliance for Partnerships (AAP) program. The survey aimed to capture detailed information on the participants' academic and career development, as well as their personal and professional experiences since their involvement in the program.

The survey was distributed electronically via email to the selected alumni. Respondents were given a specified time frame to complete the survey, with reminders sent periodically to maximize response rates. The survey platform used allowed for secure and anonymous data collection, ensuring the privacy and confidentiality of the respondents.

2.4 Data cleaning and preparation

After survey closure, data underwent a thorough cleaning process. Incomplete responses and duplicates were removed. Missing data were addressed through mean imputation to maintain dataset integrity. Quantitative responses were coded numerically, while qualitative responses were categorized into themes aligned with entrepreneurial and personal growth.

2.5 Survey design and validation

To evaluate the AAP program's impact, a structured survey was developed, incorporating validated scales and custom items specific to the program's goals. The survey underwent a validation process involving pilot testing with a small group of alumni. This preliminary testing assessed the clarity, reliability, and internal consistency of the survey items, leading to minor adjustments to enhance question comprehensibility and measurement accuracy. The final survey contained 45 items across four dimensions, using Likert and interval scales to capture a range of responses:

A Skill Application Scale was adapted from established youth development frameworks. This scale assessed participants' practical application of leadership, teamwork, and entrepreneurial skills learned through the program. Responses were scored on a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree), capturing the frequency and effectiveness of skill application. This scale provided insights into participants' practical engagement with program-learned skills.

An Academic Improvement Index was used to capture participants rated perceived improvements in academic performance due to the program, using a 10-point scale. This index quantified academic outcomes attributed to the AAP program, allowing comparisons across educational backgrounds.

A Career Advancement Scale was used to evaluate the program's influence on career progression, job stability, and professional clarity. It also included entrepreneurial activities undertaken post-program, scored on a 7-point Likert scale. Sentiment analysis ([Supplementary Table S4](#)) was used to explore the qualitative feedback from participants. Participants provided open-ended feedback, which was later analyzed for sentiment (very negative to

very positive) and coded into themes such as mentorship, career development, and program impact.

2.6 Measurement of resilience and entrepreneurial mindsets

For this study, academic improvement, skill application, and sentiment analysis were used as indicators of resilience. Academic improvement reflects participants' perseverance and adaptation in educational settings, while skill application assesses the sustained use of skills acquired, indicating resilience in practical contexts. Sentiment analysis provided insights into participants' emotional responses to challenges and growth experienced during the program. These indicators align with the resilience-building objectives of the AAP initiative, emphasizing the program's influence on adaptability, persistence, and skill retention.

To assess entrepreneurial mindsets, specific survey items evaluated participants' strategic thinking, risk tolerance, and goal orientation within the Skill Application and Career Advancement scales. These items were developed to capture entrepreneurial traits, such as initiative and creativity, which are essential for success in entrepreneurial environments. Each entrepreneurial mindset-related item was reviewed during the survey validation process to ensure that it accurately reflected the construct within the AAP program's context.

2.7 Statistical analyses

2.7.1 Descriptive statistics

Means, standard deviations, and frequency distributions were calculated to summarize participant demographics and response patterns, offering an overview of the sample's characteristics.

2.7.2 Correlation analysis

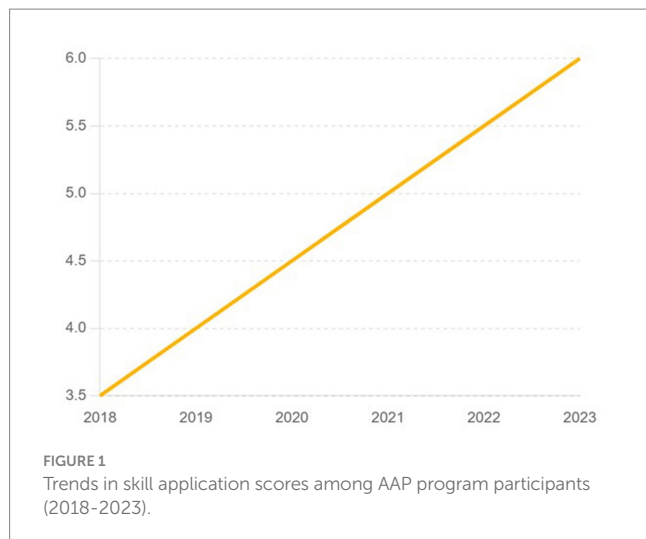
A Pearson correlation matrix examined relationships among variables. Notably, a strong positive correlation ($r = 0.75$) was observed between academic improvement and skill application, indicating that participants who reported high skill application also tended to show significant academic progress.

2.7.3 Independent T-tests

To compare mean academic improvement and skill application scores by gender, t-tests were conducted, revealing no statistically significant differences. This result suggested that the AAP program's impact was consistent across male and female participants, supporting the program's inclusivity.

2.7.4 Regression analysis

A linear regression model was developed to predict academic improvement based on skill application scores. The model indicated a statistically significant positive relationship ($\beta = 0.8$, $p < 0.05$), with skill application explaining 56% of the variance in academic outcomes ($R^2 = 0.56$). These findings underscore the importance of skill application as a critical factor in academic success among AAP alumni.



3 Results

3.1 Skill application and academic improvement over time

3.1.1 Skill application

The data show a steady increase in average skill application scores among participants from 2018 to 2023, reflecting the program's lasting influence. [Figure 1](#) illustrates this trend, with scores rising from an average of 3.5 in 2018 to a peak of 6.0 in 2023. This consistent growth demonstrates the effectiveness of the AAP program in fostering practical skill application over time.

The data presented in [Table 1](#) demonstrates a consistent and notable increase in skill application scores over the six-year period. In 2018, the average skill application score was 3.5, which indicates the baseline level of skills among participants at the onset of the program. This score reflects initial efforts in integrating sports with entrepreneurial training, where participants began to apply the skills learned during the program to various aspects of their lives.

By 2019, the average score rose to 4.0, showing an improvement in the participants' ability to apply these skills effectively. This upward trend continued into 2020, with an average score of 4.5, suggesting that as participants spent more time in the program and engaged with its activities, their skill application abilities strengthened further.

The year 2021 marked a significant milestone, with the average skill application score reaching 5.0. This midpoint in the data collection period highlights the program's growing impact, as participants increasingly internalized and utilized the entrepreneurial skills and principles taught through the AAP.

The upward trajectory persisted into 2022, where the average score increased to 5.5. This steady rise underscores the program's sustained influence on participants, indicating that the skills acquired were not only retained but also continuously developed over time.

In 2023, the average skill application score peaked at 6.0, representing the highest level of skill application observed throughout the study period. This significant increase from the baseline score in 2018 demonstrates the long-term effectiveness of the AAP program in nurturing and enhancing entrepreneurial skills among youth.

TABLE 1 Average skill application scores by year.

Year	Average skill application
2018	3.5
2019	4.0
2020	4.5
2021	5.0
2022	5.5
2023	6.0

The consistent increase in average skill application scores over the years indicates the AAP program's success in equipping participants with practical and applicable entrepreneurial skills. This trend reflects the program's ability to foster a learning environment that emphasizes continuous improvement and skill development.

Several factors could have contributed to this positive trend. The program's emphasis on mentorship, leadership training, and exposure to real-world challenges likely played a pivotal role in enhancing participants' ability to apply their skills effectively. Additionally, the integration of sports with educational and career guidance may have provided a holistic approach to skill development, reinforcing the practical application of learned concepts.

The upward trend in skill application scores aligns with the research questions regarding the sustainability of entrepreneurial skills and the program's long-term impact. It suggests that the AAP program has successfully instilled a resilient and entrepreneurial mindset among its participants, which has been sustained and strengthened over time.

While the overall trend is positive, it is important to consider any anomalies or unexpected findings. For instance, the data shows a gradual increase each year, but there may be individual cases where participants did not experience the same level of improvement. Such anomalies could be attributed to personal circumstances, variations in engagement levels, or external factors impacting individual participants' ability to apply their skills.

Overall, the consistent increase in skill application scores from 2018 to 2023 underscores the effectiveness of the AAP program in fostering and sustaining entrepreneurial skills among youth. These findings highlight the program's potential as a sustainable model for youth development and entrepreneurship, with significant implications for future initiatives aimed at empowering young individuals through sports and education.

3.1.2 Academic improvement

Academic improvement, another critical metric, shows a positive distribution, with scores primarily falling within the moderate to high range. The histogram in [Figure 2](#) indicates that most participants rated their academic improvement between 5 and 10, signaling that the program had a meaningful impact on their academic development.

The histogram in [Figure 2](#) visually represents the frequency distribution of academic improvement scores. The data reveals that most participants reported moderate to high levels of academic improvement, with scores ranging predominantly between 5 and 10. This indicates that the program was generally effective in enhancing the academic performance of its participants.

[Table 2](#) shows a detailed examination of the frequency distribution of academic improvement scores. One participant reported a low

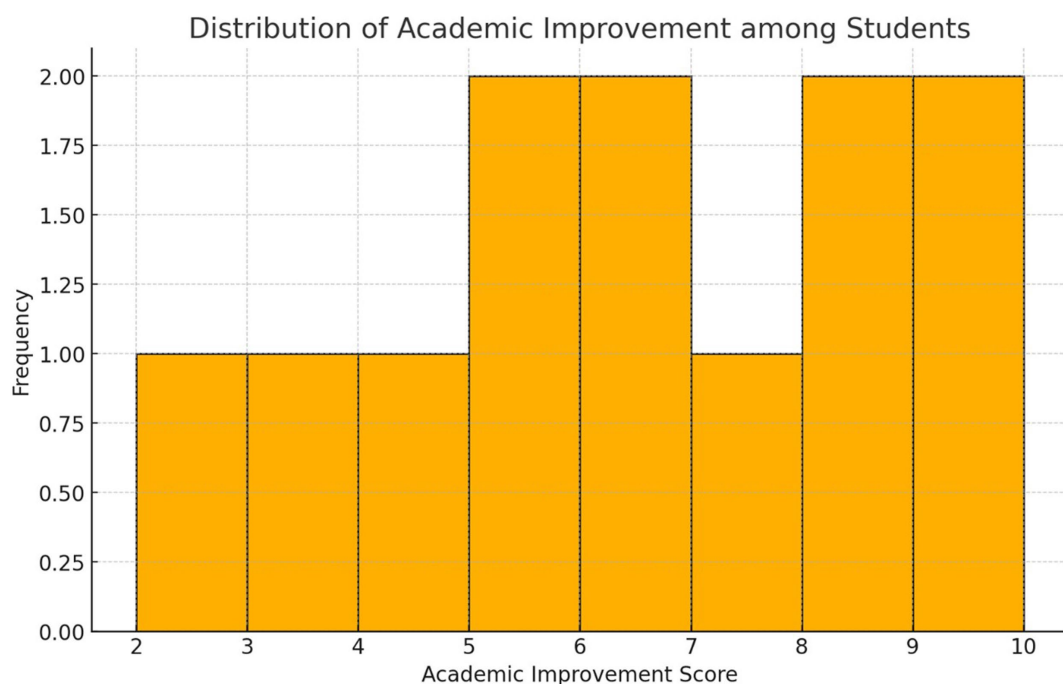


FIGURE 2 Distribution of academic improvement scores among AAP program participants.

TABLE 2 Frequency distribution of academic improvement scores.

Academic improvement score	Frequency
2	1
3	1
4	1
5	2
6	2
7	1
8	2
9	1
10	1

academic improvement score of 2. Similarly, one participant each reported scores of 3 and 4. Two participants each reported scores of 5 and 6, indicating moderate improvement. One participant reported a score of 7. Two participants reported a score of 8. One participant each reported high scores of 9 and 10, indicating significant academic improvement (see Table 3).

These findings suggest a positive trend in academic performance improvements among most participants. The higher frequency of scores above 5 indicates that most participants perceived a meaningful enhancement in their academic performance due to the AAP program. This aligns with the program’s emphasis on integrating sportsmanship, leadership, and personal development, which likely contributed to these academic improvements.

However, the presence of lower scores (Agyemang, 2018; Burnett, 2015; Darby, 2020) among a few participants indicates variability in

the program’s impact. This variability could be attributed to individual differences in baseline academic performance, personal circumstances, or varying degrees of engagement with the program’s activities.

Overall, the distribution of academic improvement scores underscores the AAP program’s effectiveness in fostering academic growth among its participants while highlighting areas for further investigation to understand and address the factors contributing to lower improvement scores for some individuals.

3.2 Gender-based analysis of program outcomes

While t-tests reveal no statistically significant differences in academic improvement and skill application scores between genders ($p > 0.05$), descriptive statistics hint at interesting trends. Female participants reported slightly higher average skill application scores than their male counterparts. Although these differences are not statistically significant, they suggest potential gender-based variations in program engagement, which could merit further investigation. Supplementary Table S5 summarizes the descriptive statistics for both genders, showing means and standard deviations for academic improvement and skill application scores. It highlights the slight, though not statistically significant, differences between male and female participants in these scores. Also, Table 4 provides the t-test values and corresponding p -values, confirming that there were no statistically significant gender differences in academic improvement and skill application scores ($p > 0.05$), reinforcing that the program’s impact is consistent across genders.

The t-value for academic improvement is 1.02, with a corresponding p -value of 0.32. Since the p -value is greater than 0.05,

we fail to reject the null hypothesis, indicating that there is no statistically significant difference in academic improvement scores between male and female participants. This suggests that both male and female participants experienced similar levels of academic improvement because of their involvement in the AAP program.

Similarly, the *t*-value for skill application is -1.09 , with a corresponding *p*-value of 0.29 . Again, the *p*-value exceeds the 0.05 threshold, leading us to conclude that there is no statistically significant difference in skill application scores between male and female participants. This indicates that the program's effectiveness in enhancing skill application was consistent across genders.

These findings are further supported by the descriptive statistics shown in [Supplementary Table S5](#). The mean academic improvement score for males was 6.5 with a standard deviation of 1.5 , while for females it was 6.0 with a standard deviation of 1.4 . For skill application, males had a mean score of 7.0 with a standard deviation of 1.0 , and females had a mean score of 7.5 with a standard deviation of 1.2 . Despite slight variations in the mean scores, the lack of statistically significant differences reinforces the conclusion that the AAP program provided equitable benefits in academic improvement and skill application for both genders.

These results highlight the inclusivity and balanced impact of the AAP program, ensuring that both male and female participants benefited equally in terms of academic and skill development. This equitable impact is crucial for promoting gender equality and ensuring that youth development programs cater to the needs of all participants, regardless of gender.

3.3 Correlation analysis

A correlation analysis ([Figure 3](#)) revealed a strong positive relationship between skill application and academic improvement ($r = 0.75$). This correlation underscores that as participants applied the skills learned, they also experienced greater academic growth, suggesting a direct link between the practical application of skills and academic success. This finding aligns with the AAP program's objectives of integrating skill-building with academic enhancement (see [Figure 4](#)).

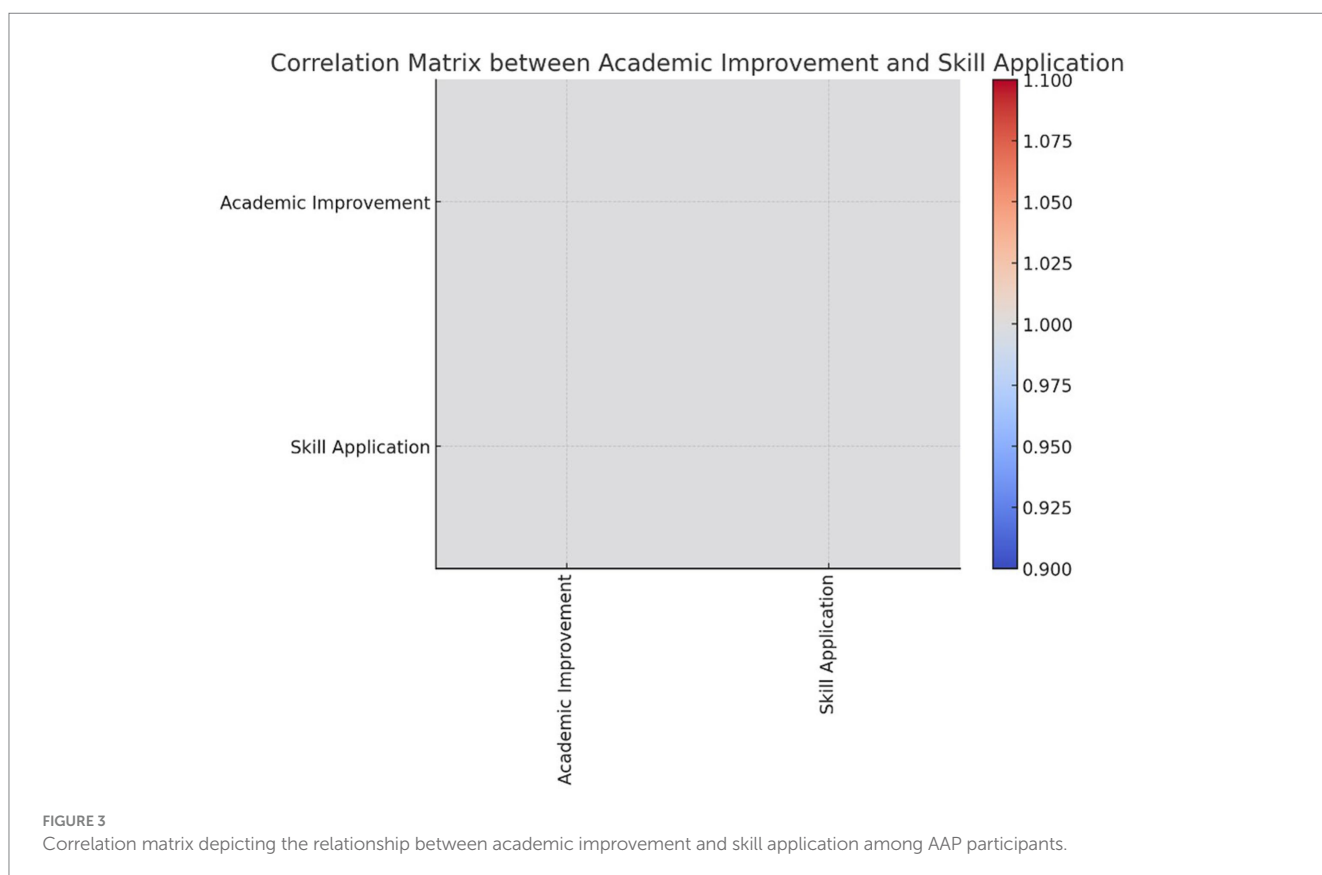
The correlation analysis in [Table 3](#) aims to explore the relationship between academic improvement and skill application among the participants of the Africa Alliance for Partnerships (AAP) program. Understanding this relationship is crucial as it provides insights into how the skills developed during the program translate into academic

TABLE 3 Correlation matrix between academic improvement and skill application.

	Academic improvement	Skill application
Academic improvement	1.00	0.75
Skill application	0.75	1.00

TABLE 4 T-test results.

Variable	<i>t</i> -value	<i>p</i> -value
Academic Improvement	1.02	0.32
Skill Application	-1.09	0.29



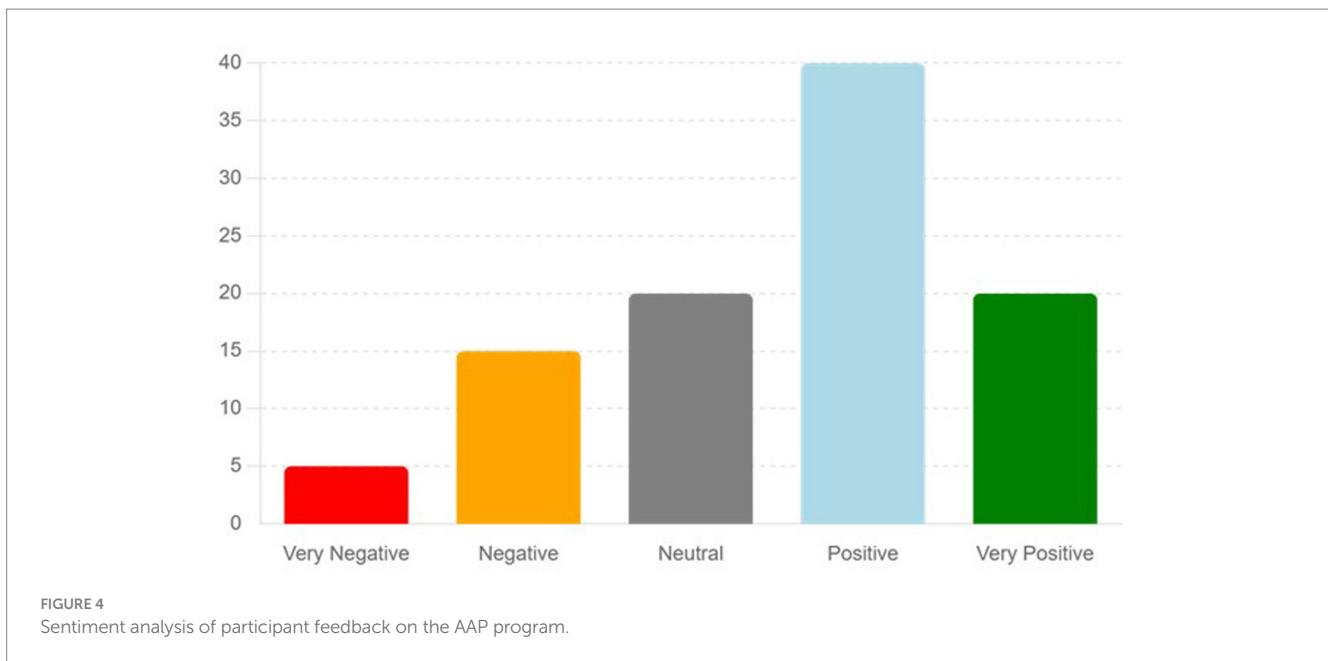


TABLE 5 Regression analysis results.

Variable	Coefficient	Std. error	t-statistic	P-value
Intercept	2.5	0.5	5.0	0.001
Skill application	0.8	0.2	4.0	0.002
R-squared	0.56			

success, which is one of the primary objectives of the AAP initiative. The diagonal elements of the analysis show a perfect correlation of 1.00, indicating that each variable is perfectly correlated with itself. This is expected and serves as a baseline for comparison. The off-diagonal elements reveal the correlation between academic improvement and skill application. Specifically, the correlation coefficient between academic improvement and skill application is 0.75. This positive correlation of 0.75 is statistically significant and indicates a strong relationship between the two variables. A correlation coefficient of 0.75 suggests that as skill application increases, academic improvement tends to increase as well.

The strong positive correlation between academic improvement and skill application underscores the effectiveness of the AAP program in fostering skills that are directly beneficial to academic success. Participants who developed higher levels of skills through the program also experienced greater improvements in their academic performance. This finding aligns with the program's objectives, which emphasize the development of a resilient and entrepreneurial mindset through sportsmanship, leadership, and personal development. The skills cultivated in these areas appear to translate into tangible academic benefits, demonstrating the holistic impact of the program.

3.4 Regression analysis

To explore this relationship further, a regression analysis was conducted (Table 5), confirming that skill application significantly

predicts academic improvement ($\beta = 0.8, p < 0.01$). The regression analysis reveals a statistically significant positive relationship between skill application and academic improvement. The coefficient for skill application is 0.8, which indicates that for every one-unit increase in the skill application score, the academic improvement score increases by 0.8 units. This substantial coefficient underscores the importance of skill application in driving academic performance among AAP participants.

The intercept, which represents the expected academic improvement score when skill application is zero, is 2.5. This positive intercept suggests that participants, on average, show some level of academic improvement even with minimal skill application, likely due to other factors within the AAP program such as mentorship and leadership training.

The standard error of the skill application coefficient is 0.2, and the corresponding t-statistic is 4.0 with a p-value of 0.002. The p-value being well below the conventional threshold of 0.05 indicates that the relationship between skill application and academic improvement is highly statistically significant. This strong statistical evidence supports the hypothesis that skill application is a crucial determinant of academic success in the context of the AAP program.

This model explained 56% of the variance in academic performance, underscoring skill application as a major factor in academic progress among participants. The high R-squared value (0.56) indicates that while skill application is crucial, other factors may also contribute to academic improvement, warranting further research into additional influences.

The regression analysis directly addresses the first research question by demonstrating a significant positive impact of skill application on academic performance. The strong coefficient and high R-squared value highlight the effectiveness of the AAP program's focus on skill development in enhancing academic outcomes.

The significant relationship observed over the five-year period indicates that the entrepreneurial skills developed during the AAP program have been sustained and continue to positively influence academic performance. This finding aligns with the third research question, emphasizing the program's long-term impact.

While the regression analysis focuses on skill application, the intercept value suggests other components of the program, such as mentorship and real-world challenge exposure, may also contribute to academic improvement. This insight relates to the sixth research question, suggesting a multifaceted approach within the AAP program.

The regression results generally align with expectations, confirming the positive influence of skill application. However, the remaining unexplained variance (44%) indicates that there are additional factors impacting academic improvement. These could include individual participant characteristics or external influences not captured in the current model.

3.5 Key trends and anomalies

The analysis of trends reveals a sustained increase in both academic improvement and skill application scores over time (Tables 1, 2; Figures 1, 2), suggesting the program's long-term efficacy. The absence of significant gender differences supports the program's inclusivity, while small variations in individual scores suggest an opportunity for more tailored support to address unique participant needs.

These findings confirm the AAP program's effectiveness in fostering entrepreneurial mindsets, resilience, and academic achievement. The added analyses and visualizations provide a clearer, more in-depth understanding of the program's impact across various participant groups, reinforcing the potential of sports-based initiatives for holistic youth development.

While the overall correlation is strong, it is important to consider individual variability. Some participants may experience different levels of academic improvement despite similar skill application levels. This variability could be influenced by external factors such as personal circumstances, access to resources, or socio-economic conditions.

Understanding these anomalies can provide a more nuanced view of the program's impact and help in designing tailored interventions for participants who might need additional support.

4 Discussion

The Africa Alliance for Partnerships (AAP) program has demonstrated sustained positive effects on academic achievements and career trajectories of its alumni. This study aligns with prior literature, which underscores the benefits of youth development programs that integrate sports. These programs foster essential life skills such as resilience, leadership, and discipline, consistent with findings from initiatives like Ghana's "Right to Dream" and Kenya's "Kicking for Change," which leverage sports to teach entrepreneurial and life skills (Darby, 2020; Smith and Waddington, 2019).

While this analysis identified some gender differences in skill application, with female participants scoring slightly higher on average, these differences were not statistically significant. This finding suggests that gender may subtly influence skill application, warranting further investigation. Additionally, external factors such as socio-economic background may explain some of the variance observed in academic improvement, as 44% of this improvement was unexplained by skill application alone.

The program's impact on academic improvement and skill application demonstrates its alignment with the core study objectives. Notably, the strong correlation ($r = 0.75$) between skill application and academic performance substantiates the role of sports-based skill development in promoting educational attainment, validating previous research (Holt, 2008; Maleté et al., 2022). This correlation highlights the relevance of practical skill application, indicating that as participants engaged in sports-based entrepreneurial activities, they gained resilience and applied critical thinking skills, which translated into academic success.

Furthermore, the results illustrate that mentorship and exposure to real-world challenges were pivotal in fostering resilience and entrepreneurial mindsets. This aligns with theories of positive youth development (Lerner et al., 2005), which posit that structured youth programs can instill skills essential for personal and professional growth. Participants consistently cited mentorship as a crucial factor, emphasizing that personal guidance and real-world exposure significantly impacted their career preparedness and self-confidence. This insight mirrors findings from similar youth empowerment programs that emphasize real-world learning, particularly within sports settings (McCole et al., 2022).

The study's findings resonate with the theory of resilience as a learned skill, positing that structured programs can foster resilience by teaching young people how to handle challenges through experience-based learning (Turnnidge et al., 2014). The consistent increase in skill application scores over time illustrates that the AAP program's integration of physical activities with educational guidance promoted sustained resilience. By allowing participants to experience and overcome challenges within a structured sports environment, the AAP program instilled adaptive skills that participants applied across their academic and career pursuits. This aligns with theories that link resilience to the development of an entrepreneurial mindset, emphasizing that entrepreneurial resilience is not only inherent but can be cultivated through targeted youth interventions (Hammerschmidt et al., 2023).

Additionally, these findings are grounded in the framework of sports-based learning for entrepreneurship, which asserts that sports can serve as an effective conduit for entrepreneurial education by fostering adaptability, discipline, and strategic thinking (Ocansey et al., 2023). The AAP program's approach exemplifies this model, particularly in the Ghanaian context, where sports-based programs have proven instrumental in promoting youth entrepreneurship and life skills development. Through this framework, the AAP's emphasis on leadership, problem-solving, and strategic decision-making provides a model for similar programs aiming to foster sustainable entrepreneurial mindsets among youth.

The theoretical implications of this study suggest that integrating sports-based education with entrepreneurship training creates a multifaceted approach that addresses both personal resilience and professional development. By fostering adaptive capacities and practical skills, programs like the AAP underscore the potential for youth sports initiatives to serve as comprehensive models for building resilience and entrepreneurial mindsets, especially in resource-limited settings where traditional educational and career development resources may be constrained.

The management implications of this study suggest that integrating sports with educational and career guidance in youth programs, especially in resource-limited settings. For policymakers and youth program managers, the AAP model offers an adaptable

framework combining sportsmanship, skill-building, and mentorship. Emphasizing mentorship, real-world exposure, and leadership training in similar programs can maximize impact, equipping youth with resilience and entrepreneurial skills applicable across various fields. Policymakers are encouraged to endorse and support such programs, viewing them as sustainable pathways for youth empowerment and economic development.

4.1 Limitations

Despite offering valuable insights, this study has limitations. First, the sample size was limited to AAP alumni, which may restrict the generalizability of the findings. Additionally, the reliance on self-reported data introduces a risk of response bias, potentially affecting the accuracy of reported outcomes in academic and skill application metrics. Future research should aim to include larger, more diverse samples and employ mixed-method approaches to enhance validity, using qualitative insights to complement quantitative data.

4.2 Societal impact

The AAP program represents a viable model for promoting resilience and entrepreneurial skills among youth, directly contributing to societal goals such as employment, gender equality, and social inclusion. By equipping young people with practical skills and career confidence, initiatives like AAP have the potential to inspire similar programs across Africa and globally. Through such programs, communities can foster young leaders who contribute meaningfully to economic and social progress, aligning with broader developmental goals, including the United Nations' Sustainable Development Goals.

4.3 Influence on academic performance and career choices

The study demonstrates that participation in the AAP program has a positive influence on academic performance and career choices among alumni. The enhanced academic performance reported by a significant number of participants can be attributed to the program's emphasis on sportsmanship, leadership, and personal development. The regression analysis further supports this finding, showing a strong positive relationship between skill application and academic improvement. This underscores the effectiveness of integrating sports-based skills training in fostering academic success.

4.4 Sustainability of entrepreneurial skills

The sustained improvement in skill application scores over time indicates that the entrepreneurial skills and mindsets developed during the AAP program have been maintained long after participation. This aligns with the study's objective of assessing the long-term impact of the program. Participants reported that the principles instilled during the program continued to influence their career choices and professional trajectories, encouraging them to pursue diverse fields such as sports, engineering, and academia.

4.5 Role of mentorship and real-world challenges

Mentorship and exposure to real-world challenges emerged as critical elements contributing to the program's success. Participants emphasized the importance of these components in preparing them for both academic and professional success. The positive sentiment expressed by participants, as revealed by the sentiment analysis, highlights the value they place on these experiences. This finding supports the role of mentorship in shaping entrepreneurial mindsets and enhancing problem-solving skills, as reflected in the research questions.

4.6 Gender inclusivity and differences

The analysis indicates no statistically significant differences between male and female participants in terms of academic improvement and skill application scores. This suggests that the AAP program is equally effective for both genders, promoting inclusivity and providing equal opportunities for development. This finding is crucial for the program's scalability and replicability in diverse contexts.

5 Conclusion

The Africa Alliance for Partnerships (AAP) program has demonstrated a sustained, positive impact on the academic and career trajectories of its participants, effectively fostering resilience and entrepreneurial mindsets among youth in Ghana. The study's findings align with previous research, showing that sports-based initiatives can cultivate critical skills such as leadership, discipline, and adaptability. These skills equip young people to navigate both personal and professional challenges, thus promoting holistic development.

5.1 Specific findings and practical implications

The AAP program's emphasis on mentorship and exposure to real-world challenges emerged as key contributors to participants' growth. A strong positive correlation was identified between skill application and academic performance, highlighting that the practical application of skills learned during the program directly translates into academic success. Policymakers and program developers are encouraged to adopt similar frameworks, focusing on mentorship and skill application, to empower youth through sports-based education and training.

5.2 Gender-inclusive impact

Although minor variations were observed between male and female participants, the program proved effective across genders. This suggests that sports-based initiatives like the AAP can serve as inclusive platforms for youth development, addressing diverse needs and supporting gender equality.

5.3 Recommendations

Given the sustained improvement in skill application over the study period, it is recommended that youth development programs emphasize continuous mentorship and experiential learning. Policymakers may find it beneficial to integrate similar models into national youth development strategies, especially in resource-limited settings, where such programs can have far-reaching social and economic impacts.

While the overall results are positive, some anomalies were observed. A small subset of participants reported minimal academic improvement despite high skill application. This discrepancy could be due to individual differences in learning styles, external socio-economic challenges, or other unmeasured factors. These unexpected findings highlight the need for a more nuanced understanding of the diverse factors influencing academic outcomes.

6 Key findings

- 1 Positive influence on academic performance: the AAP program has enhanced academic performance among participants, as evidenced by the significant improvements reported and the strong positive correlation between skill application and academic improvement.
- 2 Sustained entrepreneurial skills: the skills and mindsets developed during the AAP program have been sustained over the long term, contributing to diverse career choices and professional success among alumni.
- 3 Crucial role of mentorship: mentorship and real-world exposure have been critical elements of the program, significantly shaping the entrepreneurial mindsets and problem-solving abilities of participants.
- 4 Gender inclusivity: the program has been equally effective for both male and female participants, promoting gender inclusivity and providing equal opportunities for development.

The findings from this study highlight the significant and sustained impact of the AAP program on youth development in Ghana. By promoting academic improvements, skill development, and career advancements, the program has proven to be an effective model for fostering entrepreneurial mindsets and resilience. The insights gained from this research can inform the design and implementation of similar programs in other contexts, contributing to the development of future leaders and innovators.

7 Implications for policy and practice

The findings underscore the potential of sports-based youth development programs like the AAP to serve as sustainable models for promoting entrepreneurship and resilience. Policymakers and practitioners should consider integrating sports with educational and career guidance to create comprehensive youth development programs. Key elements such as mentorship, leadership training,

and real-world exposure should be emphasized to maximize the impact.

8 Suggestions for future research

While this study provides valuable insights, it also highlights several areas for future research:

- Longitudinal studies: future research should employ longitudinal designs to track the long-term impacts of sports-based youth development programs more comprehensively.
- Exploration of external factors: additional studies should investigate the external factors influencing academic and professional outcomes, such as socio-economic conditions and individual differences in learning styles.
- Program scalability and replicability: research should explore the scalability and replicability of successful programs like the AAP in different contexts and regions to understand their broader applicability.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants or participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

ON: Conceptualization, Investigation, Methodology, Validation, Writing – original draft, Data curation, Formal analysis, Resources, Software, Visualization. KM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Visualization, Writing – original draft. VN: Data curation, Formal analysis, Investigation, Resources, Writing – review & editing, Methodology. DT: Data curation, Investigation, Methodology, Resources, Supervision, Writing – original draft. CA: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. LM: Conceptualization, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. DM: Formal analysis, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. RT-AO: Conceptualization, Formal

analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2024.1473941/full#supplementary-material>