ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 13, Issue 3, pp: (15-23), Month: July - September 2025, Available at: www.researchpublish.com

School climate as a correlate of academic achievement among form two students in Bobirwa District, Botswana

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DOI: https://doi.org/10.5281/zenodo.15806202

Published Date: 04-July-2025

Abstract: **Academic achievement remains a critical issue in Botswana, with persistent disparities in performance across districts. Bobirwa District, in particular, has consistently recorded lower pass rates in national examinations. This study investigates the relationship between school climate and academic achievement among Form Two students in Bobirwa District. Guided by the Systems View of School Climate Theory, a correlational research design was employed. The study targeted 1,811 Form Two students from 11 secondary schools, with a stratified random sample of 365 students participating. Data were collected using the School Climate Measure (SCM) and end-of-term academic performance records. Pearson's correlation analysis revealed a significant but weak positive relationship between school climate and academic achievement, r (352) = .21, p < .001. The findings highlight the role of a supportive school climate in fostering academic success, underscoring the need for school-wide interventions aimed at improving relational, instructional, and environmental factors within educational institutions.**

Keywords: **school climate, academic achievement, secondary education, student perceptions.**

1. INTRODUCTION

Academic achievement is a significant measure of learning outcomes. It is arguably, the most paramount measure of understanding and application of skills both short and long-term competencies. Academic achievement gauges the degree to which the student's competencies match the performance criteria used in assessment and evaluation (Zysberg & Schwabsky, 2021). It reflects students' progress in the attainment of reading, numeracy and writing skills throughout their learning cycle. It is as much a reflection of one's abilities and has been used as the basis for placement and, by extension, determining one's career trajectory (Oyoo et al., 2020; Reynolds et al., 2017). Failure to meet the set levels has far-reaching implications extended across diverse systems. Underachievement prevents learners from progressing to more rigorous tertiary programs (Eugene, 2020). It is for this, that addressing achievement gaps among students has been an issue of interest for researchers and policymakers.

Literature shows evidence that academic achievement has been an issue of concern across contexts. For instance, the Organization of Economic Cooperation and Development Report (OECD, 2020) highlighted poor achievement levels below the OECD peers among secondary students in the United States, despite the country hosting most of the world's top tertiary institutions (Bouchrika, 2024). Similarly, in an earlier Program for International Students Assessments (PISA) in 2018 and National Education Program (NAEP), low proficiency levels in mathematics (25%) and science (22%) among 12th-grade learners were established in the country (DeSilver, 2018). Equally in Germany, achievements levels in international assessments has been dipping. According to Deutsche Welle (DW) Germany dropped 25 points in the 2022 PISA report, a worrying trend for the economic powerhouse of Europe. This was argued to be a function of shifts to online learning although Asian nations continued to fare well and maintain their performance (Deutsche Welle, 2023).

In the global south, concerns have been raised by the United Nations Educational, Scientific and Cultural Organization (UNESCO) over stagnant achievement levels in Southern America. Over half the learners failed to meet the basic numeracy, reading, and writing skills in the majority of the Caribbean and Latin America. Despite decades of educational progress in the region, indicators of stagnation were already obvious prior to the pandemic (NU. CEPAL, 2022). In Latin America and the Caribbean, the average educational attainment lags notably behind the OECD average, with 75% of secondary school students failing to meet basic Mathematics competencies (compared to 31% in the OECD), and over half of the students lacking fundamental Reading and Science skills (OECD, 2023).

In Africa, academic achievement levels have been notably low in the few countries participating in international assessments. According to the 2021 Program for International Reading Skills (PIRLS) report, participating African nations (Morocco, South Africa, and Egypt) had lower proficiency scores than Western and Asian nations (Foy & Almaskut 2023). Further, persistent poor academic achievement levels in both junior and senior secondary schools in Nigeria has been witnessed (Olubunmi & Kolawole 2023). The syndrome has been noted to persist despite the efforts and interventions by the government as well as research efforts addressing school and individual learner variables into the problem.

In Botswana, public education in the country has been on a decline over the last decade (Suping, 2022). The Botswana General Certificate of Secondary Education (BGCSE) pass rate for form five learners has plummeted over the years since 2015 consistently from a high of 40.7% in 2007 to an average of 28.3% between 2015 to 2021. Specifically, in the Bobirwa district, the trend is not any different. Particularly the district has had the worst performance levels historically, which was mainly blamed on the underdevelopment, harsh climate and high poverty levels (Mugari et al., 2020). According to the Botswana Examinations Council (BEC, 2023), the junior secondary pass rates in the Bobirwa district have been 25.8% in 2022 from a pass rate of 24.3% in 2021. In 2019 the pass rate was an all-time low of 17.7% from a preceding comparatively low pass rate of 27.5% in 2018. Notably, the poor academic achievement levels have been associated with the heightened dropout rates in the district currently at 4.9 to 10.5 % (Sebobi & Kelepile (2022). Most of the research effort into the gaps in achievement in Bobirwa has majorly delved into addressing social, management and pedagogical issues (Bakokonyane, 2022; Nchinyi et al., 2023; Powis et al., 2023; Sebobi & Kelepile, 2022; Tabulawa, 2023) in learning and have left out learner psychological variables that may contribute to understanding the achievement deficit in the district.

With the increase in mental health awareness, psychological well-being and positive social relationships have been established as critical in achievement contexts. Of the variables relating to students' well-being that have had a growing interest of researchers in addressing academic achievement is school climate.

School Climate

School climate is conceptualized as cognitive and affective perceptions and evaluations of the attributes or traits of the school as a collective entity (Zysberg & Schwabsky, 2021). It is characterized as the essence and nature of school existence, originating from a series of experiences, and mirroring the ambience, culture, principles, assets, and social connections of the school (Capp et al., 2023). This is understood as interpersonal relations that make the school fabric and range from both the superordinate and subordinate relations between management, staff, teachers, parents and students.

Konold et al. (2018) point out that school climate is made up of four key dimensions, school safety, teaching and learning, relationships, and external environment. Building upon this Zullig et al. (2015) synthesized these four levels and introduced parental involvement and opportunities for student engagement as additional facets of the construct. School climate encompasses students' experiences and perceptions across multiple dimensions, including positive student-teacher relationships, availability, and understanding; connectedness between students and the school community; academic and disciplinary structures that support student learning and fairness; physical upkeep; social-emotional safety regarding bullying and inclusion; parental participation; and student engagement via equitable involvement in decision-making, expressing perspectives, and accessing learning activities.

School social climate has been established to be predictive of student-level outcomes. Literature has demonstrated a well-established relationship between school climate and achievement in scholarly environments and learning such as initiative, creativity, and effectiveness (Gao et al., 2020). Favorable views of the school environment, including factors like a sense of belonging, relationships with authority figures, perceived safety, and chances for active involvement, were associated with elevated academic performance (Eugene, 2020).

It is however not clear on the mechanisms that explain the relationship between school climate and learning outcomes (Reynolds et al., 2017). Drawing from the systems view of school climate framework, however, learners derive esteem and a sense of efficacy from social connections relationships and shared practices. A healthy school climate translates into a motivating learning context, promoting effective learning approaches which enhance not only students learning outcomes but also the teachers' job satisfaction (Ismail et al., 2020). The sense of belonging is important for role modelling and alignment to shared values and achievement goals between the school administration, teaching staff and students (Davis, 2023). While there is overwhelming evidence of the role of a positive school climate in bolstering academic achievement, this is not without inconsistent and, sometimes, contradictory findings (Bear et al., 2014; Boulifa & Kaaouchi 2014; Konold et al, 2018; Tomaszewski et al., 2023). For instance, a stricter and discipline-oriented school environment was linked to higher performance levels (Konold et al., 2018). Teacher reports of school climate (Boulifa & Kaaouchi, 2014), schooling contexts (Bear et al., 2014) were a source of mixed findings.

Prior work suggests perceptions of school climate differ based on gender. Research indicates boys tend to report lower perceived school climate compared to girls (see La Salle et al., 2021). Further, Wang and Dishion (2012) found that sixth-grade girls reported higher perceptions of academic support, school behavior management, and support from teachers and peers than sixth-grade boys in the same sample. Overall, existing research suggests a gender divide in perceptions of school climate, with boys reporting lower perceived school climate across domains like safety, order and discipline, support, and discipline compared to girls in the same grade levels (La Salle et al., 2021).

From the foregoing the study sought to;

i. Examine the relationship between school climate and academic achievement

2. MATERIALS AND METHODS

Research Design

The study employed an exploratory correlational research design (Cohen & Manion, 1994), which enables the assessment of relationships between variables without manipulating the variables (Sun & Yang, 2024). This design is key as it provides a foundation for further research especially in cases where variables cannot be manipulated for ethical reasons.

Participants and Procedures

The study used a random sample of 354 (187 female, 167 male) form two students across 10 schools in Boribwa Region, Botswana. These were sampled from a target population of 1,811 students studying in 11 schools. Sampling involved multistage sampling techniques, where students across strata of boarding and day schools as well as with gender were sampled using stratified random sampling. Students in the respective schools were further sampled using simple random sampling. The use of probability sampling techniques allowed for a bias free representative sample (Rahman et al., 2022) which was reflective of the gender parity index (GPI) of secondary school enrollment in Botswana as well as with age. The students' age ranged between 12 and 17 years with an average of 14.51 (SD = 4.77) years. Study procedures involved the in-person administration of paper and pen questionnaires to the respondents. The questionnaires consisted of Likert scale items as well as a preliminary demographic section. Academic achievement was assessed using the end of term summative tests.

Instruments

School Climate Measure (Zullig et al., 2015)

Students' perceptions of school climate were measured using Zullig et al.'s (2015) updated school climate measure (SCM). The measure is a 42-item five Likert Scale with responses spanning from "Strongly Agree" to "Strongly Disagree". The SCM has been demonstrated to be a robust and valid measure of the constructed school climate. Further, the tool has been demonstrated to be a reliable measure with internal consistencies ranging from $\alpha = .89$ to $\alpha=.73$ across the ten dimensions of the measure from the validation study (Zullig et al., 2015). The authors point out that the scale can be scored for each dimension as well as a total computation across all indicators. A summated score is expected to range from 42 to 210 where high scores are interpreted as high levels of perceived positive school climate. For interpretability, the scores were transformed into average scores ranging between 1 and 5.

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Academic Achievement Proforma

Achievement levels were measured using end-of-term one, 2024 mean scores. Nabizadeh et al. (2019) opine that such examination is a reliable measure of the academic achievement levels of learners since the examinations adopt a similar approach to summative end-of-program examinations which are used to make decisions about grading and placement.

3. DATA ANALYSIS AND DISCUSSION OF FINDINGS

The collected data was entered into the SPSS software. The data was then cleaned with patterns of missingness, respondent misconduct and abandonment being checked for. Following this, descriptive and hypothesis testing was performed.

Reliability of the Instruments

The reliability of the research instrument was assessed through Cronbach's Alpha internal consistency analysis. Findings are outlined in Table 1.

Table 1: Reliability Coefficient

Scale	No of Items	Author's α	Obtained α
School Climate Measure	42	.90	.79
Relationships	10	.83	.71
Teaching and support	10	.78	.74
School safety	9	.80	.77
Opportunities for student engagement	6	.79	.67
School physical environment	4	.62	.69
Parental Involvement	3	.61	.66

As observed in Table 1, overall, the School Climate Scales had a reliability coefficient above the acceptable level of α = .70 and above. However, some of the subscales can be noted had poor reliability. This is mainly attributed to the lower number of items (below four items) in these subscales as they do not provide enough variability of responses (Taber, 2018). However, this trend is reflected in prior research across contexts (Lewno-Dumdie et al., 2020; Zulling et al., 2021).

Descriptive Analyses

Descriptive analyses were conducted on the variables, and the results are presented in Table 2.

Table 2: Descriptive Analyses

Scale	Range	*M*	*SD*	*Sk*	*Kur*
School Climate Scale	2.07 – 4.64	3.51	0.49	-0.35	- 0.26
Academic achievement (Raw)	11 – 93	42.11	22.98	0.23	-0.91
Academic Achievement (T Score)	33.76 – 79.65	50.00	10.00	42.11	22.98

Table 2 presents descriptive statistics for the School Climate Scale and Academic Achievement (both raw and T-score transformed). The School Climate Scale, with scores ranging from 2.07 to 4.64, had a mean of 3.51 (*SD* = 0.49). The distribution was slightly negatively skewed (*Sk* = -0.35) and platykurtic (*Kur* = -0.26), but both values fall within the acceptable range for normality (±1 for skewness and ±10 for kurtosis), as suggested by Demir (2022). Raw scores for Academic Achievement ranged from 11 to 93, with a mean of 42.11 (*SD* = 22.98). After transformation to T-scores, the range narrowed to 45.89 (from 33.76 to 79.65), and the mean was 50.00 (*SD* = 10.00). The distribution of raw scores exhibited a slight positive skew (*Sk* = 0.23) and was slightly platykurtic (*Kur* = -0.91), again falling within the acceptable normality range defined by Demir (2022).

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A further analysis was conducted on the subscales of the school climate assessment. The results of this analysis are detailed in Table 3.

Table 3: Descriptive Analyses on the School Climate Subscales

	N	Range	*Min*	*Max*	*M*	*SD*	*Sk*	*Kur*
Relationships	354	2.90	2.10	5.00	3.69	0.61	-0.48	0.11
Teaching & Learning	354	3.20	1.80	5.00	3.83	0.57	-0.59	0.70
School Safety	354	3.56	1.44	5.00	3.52	0.67	-0.31	0.05
Opportunities for SE	354	3.67	1.33	5.00	3.66	0.78	-0.54	0.01
Sch Physical Env	354	4.00	1.00	5.00	2.99	1.26	-0.07	-1.17
Parental Involvement	354	4.00	1.00	5.00	3.45	0.93	-0.57	0.04

Table 3 shows that respondents perceived school climate to be highest in teaching and learning (M = 3.83, SD = 0.57) and in relationships (M = 3.69, SD = 0.61). On the converse, school climate perceptions were lowest in school physical environment (M = 2.99, SD = 1.26. However, students had the highest variation from the mean in the school physical environment (SD = 1.26). The Highest range of scores were noted in the school physical environment and parental involvement (*Range* = 3.67) and lowest in relationships (*Range* = 2.90).

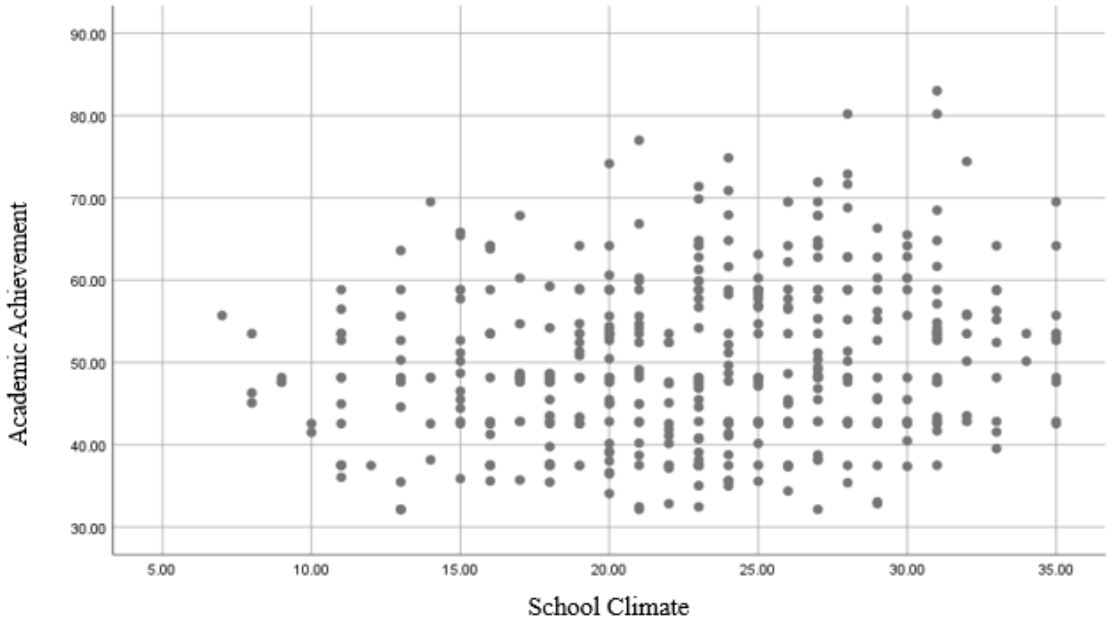
Hypothesis Testing

This study investigated the relationship between school climate and academic achievement. To address this objective, the following null hypothesis was tested.

H_0: The is no significant relationship between school climate and academic achievement among grade seven students in Boribwa District, Botswana.

Prior to testing, a test of assumption of the statistical test; Pearson's Product Moment Correlation Coefficient was performed. A scatter plot was generated in order to check for possible violations in normality as well as getting a general overview of the nature of the correlation. Figure 1 depicts the correlation between the two variables.

Figure 1: Relationship Between Teacher Self-Efficacy and Academic Achievement



As illustrated in Figure 1, there were no significant outliers in the distribution of scores. Moreover, the spread of data across the diagram denotes a weak relationship, which furthers the view that the relationship is not curvilinear. There are no data point clustered at one end of the distribution which shows that the distribution had equal variances. Having satisfied the assumptions, the hypothesis was subsequently tested using a Pearsons' Product Moment Correlation Coefficient, and findings presented in Table 4.

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Table 4: Relationship Between Teacher Self-Efficacy and Academic Achievement

Academic Achievement	*r*	*Df*
School Climate	.21***	352

Note. *** = Correlation significant at .001 level (2-tailed)

Table 4 notes that a significant positive, albeit weak relationship was established between school climate and academic achievement, r (352) = .21, $p < .001$. The null hypothesis was thus rejected and the alternative hypothesis adopted. It is therefore concluded that an incremental school climate is linked to a positive increase in students' academic achievement.

4. DISCUSSION OF FINDINGS

The study sought to establish the relationship between school climate and academic achievement. Preliminary descriptive analyses revealed reasonably average scores on school climate as well as academic achievement. Hypothesis testing revealed that students' school climate scores were significantly and positively linked to their academic achievement. This finding suggests that while there is a connection between students' perceptions of their school climate and their academic achievement, the association is not particularly strong. This modest correlation indicates that other factors likely play substantial roles in determining academic outcomes.

The findings of the current study are similar to those by Zysberg and Schwabsky (2021) among Israeli secondary school students. In their study, it was established that self-reported levels of academic achievement were significantly correlated with the relations subdimension of school climate. However, they found weak, non-significant associations between school climate and GPA ratings in mathematics and English. This aligns with our findings of a weak overall relationship. When students perceive positive relationships within their school environment, it may foster a sense of belonging and support, potentially enhancing their academic self-efficacy and motivation to engage in learning activities.

The results also align with the meta-analysis conducted by Demirtas-Zorbaz et al. (2021), which found small overall effect sizes for the relationship between school climate and academic achievement across various contexts. Their analysis revealed that while there was support for the relationship, effect sizes varied greatly across studies. This variability was attributed to the multidimensional nature of school climate, encompassing factors such as safety, relationships, teaching and learning, physical environment, parental involvement, and opportunities for student engagement. The complexity of these interrelated dimensions may contribute to the modest correlation observed in our study.

Findings from Oyebanji's (2020) study in Nigeria provide further support for our results. Using a sample of undergraduate students, Oyebanji found that school climate significantly predicted academic achievement, albeit with a modest effect. This consistency across educational levels suggests that the relationship between school climate and academic performance may persist throughout the educational journey. The mechanism underlying this association could involve the creation of a supportive learning environment that enhances students' psychological well-being and academic self-concept, indirectly influencing their academic efforts and outcomes.

Contrary to our findings, some studies have reported stronger or non-significant relationships between school climate and academic achievement. For instance, Bakokonyane (2022) in Botswana adopted a management approach and found that headship school proficiency was associated with improved learning outcomes. However, this study used a case study design and did not establish statistical significance, which may account for the discrepancy with our results. The focus on leadership proficiency rather than overall school climate could explain the stronger perceived association in their qualitative analysis.

Another study with mixed findings was conducted by Wang and Degol (2019), who found that certain dimensions of school climate, such as academic support and school connectedness, had stronger associations with academic achievement than others. This variation in the strength of relationships across different school climate dimensions could explain the weak overall correlation in our study. It's possible that while some aspects of school climate strongly influence academic performance, others may have minimal impact, resulting in a diluted overall effect.

Overall, the findings of this study contribute to the growing body of literature on the relationship between school climate and academic achievement. The weak but significant positive correlation aligns with the systems view of school climate theory (Rudasill et al., 2017), which posits that school climate is a complex, multifaceted construct that interacts with various individual and contextual factors to influence student outcomes. Future research may focus on identifying which

specific dimensions of school climate have the strongest influences on academic performance and exploring potential mediating and moderating variables that may explain the modest overall relationship observed across studies.

5. LIMITATIONS, IMPLICATIONS AND CONCLUSION.

Limitations and Future Directions

While this study offers valuable insights into the relationship between school climate and academic achievement, it is important to acknowledge its limitations. The cross-sectional design prevents us from drawing causal conclusions. Additionally, the focus on Form Four students in Botswana's Boribwa District may restrict the generalizability of our findings to other educational and social settings. Future research could expand the sample to include more diverse characteristics, different educational levels, and particularly underprivileged groups to improve internal validity. Furthermore, the development and validation of interventions addressing school climate gaps would be a valuable area of future inquiry. Finally, longitudinal studies are recommended to examine how these variables change over time and to assess the long-term impact of school climate on academic outcomes.

Implications and Conclusion

Our findings have important implications for educational practice and policy. School administration should consider fostering a positive school climate through sensitization and inclusion of all students as well as putting measures in place to ensure the realization of the same. In drafting academic achievement improvement plans, teachers, the Ministry of education and allied organizations may consider instituting better school climate.

In summary, the findings of this study indicate a weak yet statistically significant positive correlation between school climate and academic achievement. Most of the variance in academic achievement can be explained for by factors outside the study. Therefore, there is a need to conduct studies to bridge this gap, especially in Botswana where studies on the predictors of academic achievements are particularly sparse.

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