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Self-Efficacy and Students' Academic Achievement Level of Attributional Ambiguity in Public Secondary Schools in Bomet East Sub-County, Kenya

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ABSTRACT : Background: Examination results do not explain themselves, and students must decide whether a grade reflects ability, effort, preparation, task difficulty or circumstances beyond their control. Self-efficacy is strongly linked to achievement, but whether it influences how clearly students can explain their results is unknown, particularly in rural Kenyan secondary schools. Objective: To determine the influence of self-efficacy on students' academic achievement level of attributional ambiguity in Bomet East Sub-County, Kenya.
Methods: A correlational, cross-sectional design guided by Social Cognitive Theory and Attribution Theory was used. A sample of 365 Form Four students in 19 of 48 public secondary schools was drawn through purposive selection of schools, probability proportional to size allocation and simple random sampling. A self-administered five-point Likert questionnaire measured self-efficacy and attributional ambiguity. Data were analyzed with descriptive statistics, Pearson correlation and simple linear regression in SPSS at the .05 level.
Results: The response rate was 100%. Self-efficacy was high ($M = 83.36$, $SD = 11.81$) and attributional ambiguity moderate ($M = 55.41$, $SD = 18.52$). Self-efficacy had a very weak, non-significant negative correlation with attributional ambiguity ($r = -.049$, $p = .178$) and did not predict it ($R^2 = .002$, $F(1, 363) = .858$, $p = .355$, $B = -.076$). The null hypothesis was retained. Conclusion: Confidence in one's academic capability does not by itself make the causes of results clearer. Ceiling effects, the distinction between task confidence and outcome interpretation, and a shared feedback environment account for the result. Efficacy-building programs should be paired with teaching students to analyze why they obtain their results.

KEYWORDS: *self-efficacy; attributional ambiguity; academic achievement; secondary school students; Social Cognitive Theory; Attribution Theory; Kenya*

I. INTRODUCTION

Students receive academic outcomes in the form of examination grades, class rankings and teacher comments, but these outcomes do not explain themselves. A student who receives a poor grade must decide whether the result reflects ability, effort, preparation, the difficulty of the paper, the way it was marked or the emotional state in which it was written. Attribution Theory holds that the causes students assign to their outcomes shape their emotions, expectations and later motivation (Weiner, 1985). Attributional ambiguity is the uncertainty that arises when more than one plausible explanation for an outcome exists and the person cannot tell which one applies (Crocker & Major, 1989). In this article the concept is applied to students' academic achievement level of attributional ambiguity, which is the degree of uncertainty students experience when explaining their academic outcomes. The article asks whether one self-perceptual construct, self-efficacy, influences that degree of uncertainty among secondary school students in a rural Kenyan sub-county.

Self-efficacy is the belief in one's capability to organize and execute the courses of action required to produce given attainments (Bandura, 1997). It is among the most extensively researched constructs in educational psychology and has been consistently linked to motivation, persistence, self-regulated learning and academic achievement (Pajares, 1996; Zimmerman, 2000; Schunk & DiBenedetto, 2020). A meta-analysis of ten international studies confirmed a robust positive relationship between self-efficacy and academic achievement (Suartini, 2023), and a further meta-analysis established that self-efficacy protects students' academic resilience (Huang, 2023). In Africa, self-efficacy was significantly related to the academic performance of senior secondary students in south-western Nigeria, where external examination results have

been unstable (Ajadi, 2025), and a significant positive correlation with achievement was found among middle school students in Ghardaia, Algeria (Benyoucef & Tabachi, 2024).

These studies share one feature. They treat achievement as the outcome to be explained and rarely ask how clearly students can explain the achievement itself. Uncertainty about causes is not a trivial matter. A meta-analysis of studies in achievement contexts linked causal attributions to what learners subsequently do (Brun et al., 2021), and nationally representative evidence from the United States found that attributional ambiguity was associated with more depressive symptoms and poorer self-reported mental health (Cuevas et al., 2024). If students cannot tell why they succeed or fail, they may find it hard to decide what to change, and their confidence and persistence may suffer (Weiner, 1985).

The question is especially pertinent in Kenya, where the Kenya Certificate of Secondary Education (KCSE) is the terminal measure of secondary school achievement and a major determinant of access to university and other opportunities. Students are ranked competitively, sit several rounds of mock examinations and often receive delayed, summative feedback that shows the score but not the reasons for it. Evidence from East African secondary schools shows that unclear assessment criteria and limited formative feedback are associated with heightened anxiety and with reduced clarity in students' understanding of their own academic standing (Mkumbo & Amani, 2022), and that vague or infrequent teacher feedback is associated with lower and more variable self-efficacy (Kariuki & Kimathi, 2023). These findings suggest that self-efficacy and clarity of interpretation may be linked through the feedback environment, yet the link has not been tested directly.

Bomet East Sub-County in Bomet County shares these national features and adds local ones. Its public secondary schools operate with limited material resources, large classes and underdeveloped guidance and counseling support, and school-related factors associated with dropout have been documented in the sub-county (Koech, 2025). Education office reports on the KCSE and on mock examinations indicate that a substantial proportion of candidates obtain the lowest grade categories (Bomet County Education Office, 2024, 2025). These reports do not measure attributional ambiguity, but they raise a reasonable concern. Students who sit repeated examinations and still obtain low or fluctuating grades may be unsure whether their results reflect ability, effort, anxiety, the difficulty of the papers or circumstances beyond their control. To the knowledge of the researchers, no study has examined how self-efficacy influences students' academic achievement level of attributional ambiguity in Bomet East Sub-County or in any comparable rural Kenyan setting.

1.1 Statement of the problem

Examination grades show what students have achieved, yet they do not necessarily explain why the outcome occurred. Students therefore have to interpret the causes of their own success or failure, and this interpretation may be unclear, particularly when students are uncertain whether an outcome reflects their ability, effort, emotional state, task difficulty or external circumstances. Theory suggests that the way students see themselves may be part of the explanation, and students who doubt their capability may find it harder to decide what caused a result (Bandura, 1997; Weiner, 1985). Studies at the global, continental, regional and national levels have linked self-efficacy to achievement, but they did not measure how uncertain students are about the causes of that achievement. Schools and counselors therefore emphasize performance, and efforts to build confidence, without knowing whether students' self-efficacy helps or hinders their interpretation of results.

1.2 Purpose, objective and hypothesis

The purpose of this article is to report the influence of self-efficacy on students' academic achievement level of attributional ambiguity among Form Four students in public secondary schools in Bomet East Sub-County, Bomet County, Kenya. The objective was to determine the influence of self-efficacy on students' academic achievement level of attributional ambiguity. The study tested one null hypothesis at the .05 level of significance:

H_{02}: Self-efficacy has no significant influence on students' academic achievement level of attributional ambiguity in Bomet East Sub-County.

A null hypothesis states that no significant influence exists between a predictor and the outcome in the population, and it is the statement that is tested statistically and then retained or rejected on the evidence (Creswell & Creswell, 2018).

1.3 Significance of the study

The study contributes to theory by testing Social Cognitive Theory and Attribution Theory together in a setting where they have rarely been applied. Social Cognitive Theory explains how personal beliefs shape thought and action (Bandura, 1986, 1997), and Attribution Theory explains how people assign causes to outcomes (Weiner, 1985). By relating self-efficacy to attributional ambiguity, the study shows whether confidence in one's own capability helps to explain uncertainty in interpreting results. For teachers and counselors, the finding indicates whether programs that build student confidence can be expected to make results more understandable to learners. For policy makers, including the Ministry of Education, the Kenya

National Examinations Council and the Teachers Service Commission, it informs feedback practices in national and school-based assessment. The study also adds evidence from a rural Kenyan sub-county to a literature drawn mostly from other settings.

II. LITERATURE REVIEW AND THEORETICAL BACKGROUND

2.1 Conceptualizing self-efficacy and attributional ambiguity

Self-efficacy refers to an individual's belief in capability to organize and execute the actions required to produce a given attainment (Bandura, 1997). It is distinct from self-esteem, which concerns a person's overall evaluation of their worth, because it is a judgment of capability for particular tasks and domains. Bandura (2006) cautioned against generalized self-efficacy scales in academic research and recommended task-specific or domain-specific measures tailored to the context under investigation, a recommendation reinforced by Pajares and Urdan (2006). In this study self-efficacy refers to students' perceived capability to successfully undertake and accomplish academic tasks.

Attributional ambiguity was first articulated within the social psychology of stigma. Crocker and Major (1989) used it to describe the difficulty members of stigmatized groups experience in deciding whether feedback reflects their own performance or prejudice against their group. The present study extends the underlying logic of interpretive uncertainty into the academic domain. Students' academic achievement level of attributional ambiguity is the degree of uncertainty students experience when interpreting and attributing the causes and meaning of their academic achievement outcomes, such as whether success or failure is attributable to ability, effort, anxiety, task difficulty, teacher expectations or other internal and external factors. Where the construct has been applied, it has been examined mostly in relation to social stigma, ethnic identity and mental health among adults and university students in Western contexts (Cuevas et al., 2024; Kim & Park, 2024), and not in relation to the examination systems and self-beliefs of secondary school students in Africa.

2.2 Theoretical background

The study is anchored on Attribution Theory as advanced by Weiner (1985, 1986), complemented by Bandura's (1986, 1997) Social Cognitive Theory. Attribution Theory originated in the work of Heider (1958), who proposed that individuals act as intuitive scientists constantly searching for the causes of events. Weiner (1972, 1985) extended this framework to achievement motivation, proposing that when students experience success or failure they engage in a causal search that results in an attribution. The causes most commonly cited are ability, effort, task difficulty and luck, and they can be classified along three dimensions: locus of causality (internal or external), stability (stable or variable) and controllability (controllable or uncontrollable). The combination a student assigns has consequences for emotion, expectancy of future success and persistence. A meta-analysis of studies that measured these dimensions directly confirmed that they reliably predict cognitive, emotional and behavioral consequences across achievement settings (Brun et al., 2021).

Weiner's framework, like most subsequent attribution research, implicitly assumes that students eventually arrive at a definite, even if sometimes inaccurate, causal explanation. What it does not explicitly theorize is the possibility that a student may be unable to settle on any single explanation, remaining in a state of sustained interpretive uncertainty in which insufficient ability, insufficient effort, a difficult paper or simple misfortune all appear plausible without any one becoming convincing. This state is what the present study terms attributional ambiguity.

Social Cognitive Theory supplies the account of how self-referential beliefs such as self-efficacy are formed. It rests on triadic reciprocal determinism, according to which human functioning arises from continuous, bidirectional interaction among personal factors, behavioral factors and environmental factors (Bandura, 1986). In school, a student's self-efficacy influences how much effort is invested in preparing for an examination, the effort shapes the feedback received from teachers and from results, and the feedback shapes later self-efficacy. Bandura (1997) identified four principal sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states. Each depends to a significant degree on the clarity and interpretability of the feedback available in the student's environment. A mastery experience strengthens self-efficacy only if the student can attribute the success to personal effort and ability and not to an easy paper or to chance. Social Cognitive Theory therefore presupposes a correct attribution but does not itself theorize how it is made, and it is at this point of presupposition that the two theories meet.

Two cautions apply. First, Weiner's categories and Bandura's principles were developed largely in Western educational systems with small classes, abundant resources and continuous individualized feedback. Graham (1991) noted that the weight given to ability and effort as explanations varies across cultures, and Kenyan students may draw also on communal, familial or spiritual explanations. Second, the reciprocal logic of Social Cognitive Theory implies that the reverse direction of influence, in which ambiguity feeds back to destabilize self-efficacy, is equally plausible (Marsh & Craven, 2006). The cross-sectional design of this study cannot adjudicate between the two directions, and the findings are interpreted as associations.

2.3 Empirical literature on self-efficacy

2.3.1 Global and continental evidence

The global evidence on self-efficacy is extensive and consistent. Meta-analytic work confirms a robust positive relationship with achievement across diverse educational settings (Suartini, 2023), and with academic resilience, so that students with strong efficacy beliefs recover better from setbacks such as poor mock examination results (Huang, 2023). Foundational reviews recognize that self-efficacy operates as a lens through which students interpret evaluative information (Usher & Pajares, 2008; Schunk & DiBenedetto, 2020). Yet these works, like much of the global literature, evaluate the construct in relation to achievement outcomes. They do not specify what happens to a student's causal reasoning when the evaluative information is itself unclear, delayed or contradictory. This is a persistent theoretical silence, because the lens metaphor implies an effect on interpretation without stating whether that effect extends to the certainty with which an interpretation is held.

Within Africa, the relationship between self-efficacy and achievement has attracted growing attention. Ajadi (2025) surveyed 384 senior secondary students across the six south-western states of Nigeria and found a significant relationship between self-efficacy and academic performance despite fluctuating results in externally set examinations between 2020 and 2024. Benyoucef and Tabachi (2024) found a high level of self-efficacy among middle school students in Ghardaia, Algeria, and a significant positive correlation with achievement drawn from official school records. These conditions of examination volatility parallel the high-stakes environment of the KCSE. The continental literature therefore confirms that self-efficacy is a robust predictor of achievement, but none of these studies extends its analysis to interpretive uncertainty.

2.3.2 Regional and Kenyan evidence

In East Africa, self-efficacy has often been studied together with the quality of teacher feedback. Kariuki and Kimathi (2023) found that the frequency and specificity of teacher feedback was strongly associated with the strength of students' self-efficacy, with students who received vague or infrequent feedback reporting markedly lower and more variable scores. The finding identifies feedback ambiguity, rather than feedback as such, as the mechanism linking teacher practice to student self-belief, which maps closely onto the logic of attributional ambiguity although the study did not use that term. The authors recommended that Kenyan schools invest in structured, specific and timely feedback, particularly ahead of national examinations. Cao and Han (2024) and Riegel et al. (2025) examined unclear or inconsistent assessment feedback in contexts comparable to Kenyan schooling and found that it reduced student confidence and increased reported confusion about academic standing, although neither measured the resulting confusion as attributional ambiguity within a formal attributional framework.

Related evidence points in the same direction. Luo et al. (2022) and Liu et al. (2020) reported that students with weaker self-efficacy beliefs were more likely to oscillate between internal and external explanations of their performance when results were ambiguous, a pattern the authors described as instability in causal reasoning. AL-Qadri et al. (2024) reported heightened confusion and disengagement among secondary school learners under conditions of unclear academic expectations. These studies suggest that the building blocks for studying self-efficacy in relation to attributional ambiguity already exist in the regional and Kenyan literature, but no study identified assembled them into a single, formally operationalized investigation of self-efficacy as a predictor of students' academic achievement level of attributional ambiguity.

2.3.3 Measurement, calibration and context

Reviewing the studies above, Kenyan and continental researchers have generally heeded Bandura's (2006) advice, with Kariuki and Kimathi (2023) and Ajadi (2025) both using academically specific self-efficacy instruments. Zimmerman (2000) further distinguished efficacy for performance, which is confidence in achieving a particular grade, from efficacy for self-regulation, which is confidence in managing the study behaviors that lead to strong performance. The two are correlated but conceptually distinct and may relate differently to attributional clarity. A student with strong self-regulatory efficacy may explain a poor result in terms of a specific, controllable cause such as insufficient revision time, whereas a student lacking both forms may struggle to identify any controllable cause at all. This distinction has not been examined in the Kenyan or African studies reviewed.

Context matters too. The Bomet County Education Office (2024) reported comparatively weaker KCSE mean scores in mathematics and the physical sciences in the sub-county. Because self-efficacy is domain-specific rather than uniformly global (Bandura, 2006; Pajares, 1996), this raises the possibility that efficacy is lower, and ambiguity higher, in those subjects. Bandura's (1997) sources of efficacy are also unequally available. Students in under-resourced schools with larger classes, fewer qualified teachers and fewer visible role models may have reduced access to vicarious experience and verbal persuasion, a structural inequality not yet examined in relation to attributional ambiguity.

2.4 Research gaps

Three gaps justify the study. At the level of knowledge, regional and Kenyan research shows that self-efficacy is sensitive to the clarity of feedback and assessment practice, but it stops short of measuring whether this sensitivity translates into differences in students' ability to form clear causal explanations for their results. At the theoretical level, Social Cognitive Theory offers a plausible mechanism, namely the processing and interpretation of feedback, but the mechanism has not been tested with an attribution-theoretic dependent variable in Kenyan secondary education. At the methodological level, most studies reviewed correlate self-efficacy with raw achievement scores, and very few use regression designs to test self-efficacy as a predictor of a distinct measure of interpretive uncertainty.

2.5 Conceptual framework

Figure 1 presents the relationship tested. Self-efficacy is the independent variable and students' academic achievement level of attributional ambiguity is the dependent variable. Consistent with the integrated theoretical position, students with stronger self-efficacy were expected to find it easier to construct clear, stable and confident explanations for their results, and so to show lower ambiguity. The arrow corresponds to the null hypothesis H_{02}. The simplification does not deny that self-efficacy is related to other constructs, nor that the relationship may be reciprocal.

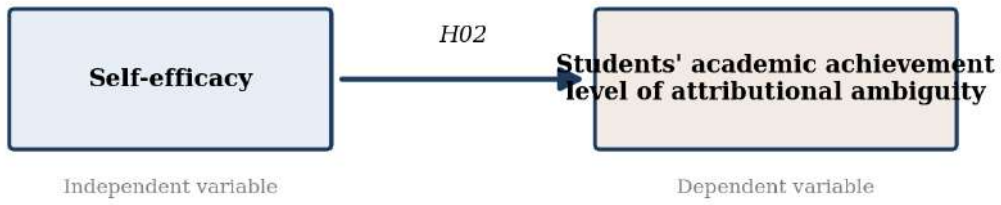


Figure 1. *Conceptual framework: the hypothesized influence of self-efficacy on students' academic achievement level of attributional ambiguity.* Source: Researchers (2026).

3. METHODOLOGY

3.1 Research design

The study adopted a correlational research design with a predictive analytical approach. A correlational design is non-experimental and examines the direction and strength of relationships among variables as they occur naturally, without manipulation of the independent variable (Creswell & Creswell, 2018; Cohen et al., 2018). It was appropriate for three reasons. First, self-efficacy and attributional ambiguity are psychological constructs that cannot be manipulated in school settings, and doing so would be impractical and ethically questionable (Fraenkel et al., 2019). Second, the study sought to establish whether and how strongly the constructs were related, and not to prove cause and effect, which correlational designs do not permit (Bryman, 2016). Third, correlational data support regression analysis, which estimates how much of the variance in a dependent variable a predictor explains without implying causation (Tabachnick & Fidell, 2019). The approach was purely quantitative and cross-sectional, because data were collected from students at a single point in time, and it was guided by a post-positivist orientation, which holds that psychological constructs can be measured objectively through valid instruments while recognizing that measurement is never perfect (Creswell & Creswell, 2018).

3.2 Study location, population and sample

The study was conducted in Bomet East Sub-County, Bomet County, in the South Rift region of Kenya. The sub-county has public secondary schools of different kinds, including boys', girls' and mixed schools, and day, boarding and day-and-boarding schools, spread across different geographical and administrative areas. At the time of the study no private secondary school in the sub-county offered Form Four classes, so the study focused exclusively on public schools. The target population comprised all Form Four students in public secondary schools in the sub-county. Records from the Sub-County Education Office (Bomet East Sub-County Education Office, 2024) show 4,372 Form Four students in 48 public secondary schools. Form Four students were targeted because they are in their final year, a stage marked by intense academic demands and by the high-stakes KCSE, and because they have had sustained exposure to assessment, teacher evaluation

and competitive academic environments that contribute to relatively stable self-perceptions and attributional tendencies.

Slovin's formula, at a 95% confidence level and a 5% margin of error, was used to determine the sample size for this finite population (Yamane, 1967; Israel, 1992), and the sample was set at 365 students. This sample was adequate for correlation and regression. Tabachnick and Fidell (2019) recommend a minimum of 50 + 8*m* cases, where *m* is the number of predictors, which gives 82 for four predictors and is greatly exceeded by 365. The sample also gives power of about .82 to detect a correlation of .15 in a two-tailed test at the .05 level (Cohen, 1988), so correlations of educational importance were unlikely to be missed, which reduces the risk of Type II error (Hair et al., 2019).

A multi-stage sampling procedure was used (Creswell & Creswell, 2018; Kothari, 2004). At the first stage, purposive sampling selected 19 of the 48 public secondary schools, guided by school gender category, residential status and broad geographical coverage, so that different institutional contexts were represented. At the second stage, probability proportional to size allocation determined the number of students drawn from each school according to its Form Four enrolment (Cochran, 1977); the total enrolment in the sampled schools was 2,484. At the final stage, simple random sampling selected individual students from the Form Four class registers, so that every eligible student, whatever his or her performance level, had an equal and independent chance of selection.

3.3 Research instrument

A self-administered student questionnaire was the only instrument. Section A collected demographic information. Sections B to F measured self-esteem, self-efficacy, examination anxiety, locus of control and attributional ambiguity, each with five items rated on a five-point Likert scale from Strongly Disagree (1) to Strongly Agree (5). Scoring was arranged so that higher scores indicated higher levels of the construct measured. Scale scores are reported on a 100-point metric in the results below. The two sections relevant to this article are described below.

Self-efficacy. The five self-efficacy items addressed confidence in completing assignments on time, organizing a study schedule for examinations, understanding difficult topics when effort is invested, solving challenging academic problems independently and maintaining focus and concentration during study sessions. An example item is "I am able to understand difficult topics if I put in enough effort." The items refer to academic tasks and are therefore domain-specific in the sense recommended by Bandura (2006). They address efficacy for performing academic tasks and do not separate efficacy for performance from efficacy for self-regulation (Zimmerman, 2000).

Attributional ambiguity. The five items were developed for this study, guided by Weiner's causal dimensions of locus, stability and controllability, because no validated instrument combining these measures existed for Kenyan secondary schools. They addressed how often students are unsure or confused about why they succeed or fail and whether they can explain differences between their performance and that of classmates. An example item is "I feel confused about the reasons behind the grades I receive in examinations." Higher scores indicate greater ambiguity.

3.4 Pilot testing, validity and reliability

A pilot study was conducted with about 10% of the intended sample, approximately 37 students, drawn from a neighboring sub-county with similar characteristics. Piloting outside the study area prevented contamination of the main sample. The pilot assessed item clarity, feasibility and reliability, and the results were used to revise ambiguous or weak items. Validity is the extent to which an instrument measures what it is intended to measure (Cohen et al., 2018). Content validity was established through expert review, and construct validity was ensured by aligning the items with the study objectives, the conceptual framework and the theoretical foundations of Attribution Theory and Social Cognitive Theory, so as to avoid construct underrepresentation and contamination. Reliability was examined through internal consistency using Cronbach's alpha, with a coefficient of 0.70 or higher taken as acceptable (Tavakol & Dennick, 2011), through test-retest correlation of two administrations to the pilot participants, and through item-total correlations, with weak items revised or removed.

3.5 Data collection and ethical considerations

Authorization was obtained from the university, the National Commission for Science, Technology and Innovation (NACOSTI) and the Sub-County Education Office. The principals of sampled schools were informed and dates agreed. Informed consent was obtained before data collection, and students were told the purpose of the study and the voluntary nature of participation. Questionnaires were administered during school hours with the assistance of class teachers. Participants were assured of confidentiality and anonymity, and no identifying information was collected. The study posed minimal risk because the questionnaire dealt with non-intrusive academic perceptions phrased in a neutral manner, and respondents were free to skip any item. Hard-

copy questionnaires were stored securely, electronic data were password-protected, and raw data were to be destroyed at the end of the research in line with university and NACOSTI requirements.

3.6 Data analysis

Questionnaires were checked for completeness, coded and entered into the Statistical Package for the Social Sciences (SPSS), and the data were screened for missing values, out-of-range entries and outliers. Descriptive statistics (frequencies, percentages, means, medians, standard deviations, variances, skewness and range) and histograms summarized the sample and the distributions of the variables. Skewness and histograms were used to judge whether distributions were close enough to normal for parametric tests; with a sample of 365 the Pearson correlation and linear regression are robust to moderate departures from normality (Tabachnick & Fidell, 2019). For group comparisons, scores were grouped into low, moderate and high categories describing relative standing within the sample.

Inferential analysis proceeded in two steps. First, Pearson's product-moment correlation coefficient established the direction and strength of the relationship between self-efficacy and attributional ambiguity, and 95% confidence intervals were calculated using Fisher's z transformation. Second, simple linear regression determined whether self-efficacy influenced attributional ambiguity, using the model $Y = \beta_0 + \beta_1 X + \varepsilon$, where Y is attributional ambiguity and X is self-efficacy. The model summary, analysis of variance and coefficients were reported, and effect sizes were interpreted against the benchmarks of Cohen (1988), under which correlations of about .10, .30 and .50 represent small, medium and large effects. The null hypothesis was tested at the .05 level of significance, rejected where $p < .05$ and retained otherwise. Correlation significance is reported one-tailed, as produced by SPSS, while F and t tests in the regression are two-tailed.

IV. RESULTS

4.1 Response rate and respondent profile

All 365 questionnaires were administered and all were returned in usable form, giving a response rate of 100%. Mugenda and Mugenda (2003) regard a response rate of 70% and above as very good for survey research. There were no missing values on the study variables, so all 365 cases contributed to every analysis. The high return is attributed to administration during school hours with the assistance of class teachers, prior consent from the education office and school administrations, and assurance of anonymity.

Table 1 summarizes the profile of respondents. The sample was almost evenly divided between the sexes (51% female and 49% male), and 71.7% of respondents were aged 17 or 18 years, which matches the age at which most learners complete Form Four. About one fifth of respondents (21.2%) were aged 19 years or above, and roughly two thirds of this older group were male. This is not surprising in a rural sub-county where late entry, grade repetition and interrupted schooling are common, and where school inefficiencies and socioeconomic pressure affect progression (Koech, 2025). Mixed schools contributed 72.6% of respondents, boys' schools 14.0% and girls' schools 13.4%, and day-and-boarding schools formed the largest residential category (41.6%). Because only about 51 respondents came from boys' schools and about 49 from girls' schools, percentages for those groups rest on small numbers and are less stable.

Table 1. *Profile of respondents (N = 365)*

Characteristic	Category	Percentage of sample
Gender	Female	51.0
	Male	49.0
Age (years)	15–16	7.0
	17	32.8
	18	38.9
	19	15.1
	20 and above	6.1
School type	Mixed	72.6
	Boys'	14.0
	Girls'	13.4
Residential status	Day-and-boarding	41.6
	Day	32.9
	Boarding	25.5

Note. Percentages are shares of the total sample of 365 respondents. Percentages within each characteristic sum to approximately 100 because of rounding.

4.2 Descriptive profile of self-efficacy and attributional ambiguity

Table 2 presents the descriptive statistics. Self-efficacy recorded the highest mean of the study variables (M = 83.36, SD = 11.81), with a median of 84.00 and a mode of 80.00. Attributional ambiguity had a mean of 55.41 (SD = 18.52), a median of 56.00 and a mode of 40.00, and it varied widely, with scores from .00 to 96.00 and the largest variance of any variable in the study (342.86). Expressed as a percentage of the mean, the standard deviation was 14.2% for self-efficacy and 33.4% for attributional ambiguity. Students therefore resembled one another more in their confidence than in how certain they were about the causes of their results. The wide spread of attributional ambiguity is favorable for analysis, because a dependent variable that varies considerably gives a predictor something to explain.

Table 2. *Descriptive statistics for self-efficacy and attributional ambiguity (N = 365)*

Statistic	Self-efficacy	Attributional ambiguity
Valid *N* (missing)	365 (0)	365 (0)
Mean	83.36	55.41
Median	84.00	56.00
Mode	80.00	40.00
Standard deviation	11.81	18.52
Variance	139.55	342.86
Skewness	−1.235	−0.323
Minimum	20.00	0.00
Maximum	100.00	96.00
Range	80.00	96.00

Note. Higher scores indicate stronger self-efficacy and greater attributional ambiguity.

Figure 2 shows the histogram of self-efficacy scores. The distribution has a tall peak near 80, a cluster of scores between 80 and 100 pressing against the upper limit of the scale, and a long tail on the lower side extending to a minimum of 20.00. Its skewness of −1.235 is the most pronounced of the variables studied, and the 80-point range results from a few extreme low scores on an otherwise compact distribution. Form Four students in the sub-county are, as a group, confident in their capacity to manage the academic tasks of their final year, as one would expect of learners who have remained in school through three years of secondary education despite the

dropout pressures documented locally (Koech, 2025). The compression of scores near the upper limit is nevertheless a methodological feature that matters when predictive power is assessed. Only self-efficacy exceeded the value of −1 commonly taken as a signal of marked skew, and with 365 cases the Pearson correlation and regression remain robust (Tabachnick & Fidell, 2019). Figure 3 shows that attributional ambiguity has a broad, fairly flat distribution with a plateau of frequent scores between about 40 and 80, which shows that students sit at low, middle and high levels and that there is variation to be explained.

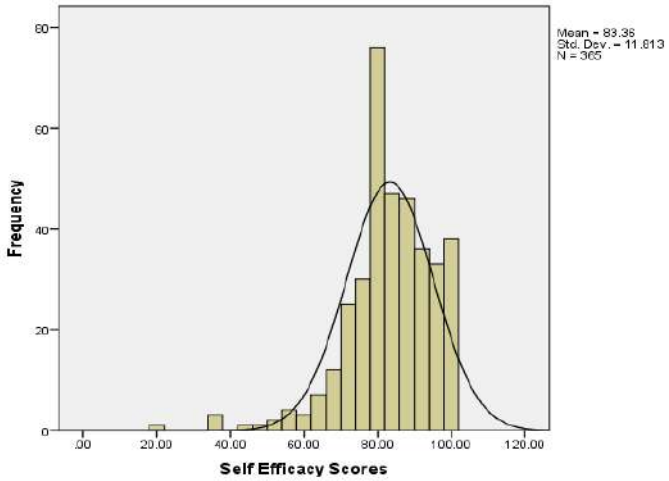


Figure 2. *Histogram of self-efficacy scores (M = 83.36, SD = 11.81, N = 365).*

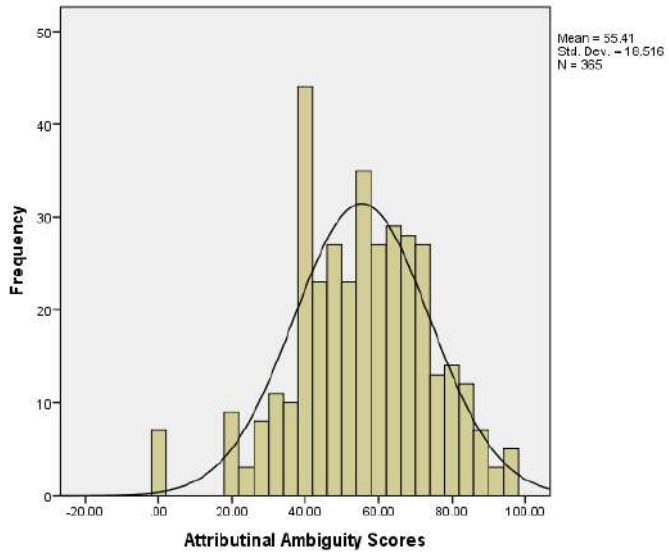


Figure 3. *Histogram of attributional ambiguity scores (M = 55.41, SD = 18.52, N = 365).*

4.3 Self-efficacy by gender, school type and residential status

Table 3 gives the distribution of self-efficacy across low, moderate and high categories for the sample and for subgroups, and Figure 4 displays the subgroup patterns. Overall, 45.2% of respondents fell in the low category, 25.5% in the moderate category and 29.3% in the high category. Because the categories describe relative standing within the sample, a large low category does not contradict the high mean in Table 2; it reflects the way the distribution was divided.

By gender, the same proportion of male and female students (29.3% of each sex) fell in the high category, while 43.1% of males and 47.3% of females fell in the low category. The small female disadvantage is narrower than the gap observed for other self-perceptual constructs in the wider study, which suggests that confidence in the capacity to carry out academic tasks is less gendered. By school type, the low category held 47.9% of mixed-school students, 46.9% of girls' school students and 29.4% of boys' school students, and 43.1% of boys' school students fell in the moderate category. The high category was similar across school types (29.8%, 28.6% and 27.5%). By residential status, the low category was markedly larger among day-and-boarding students (55.9%)

than among day students (37.5%) and boarding students (37.6%). A possible reading is that day-and-boarding schools combine students who go home each evening with those who remain on the compound, producing a more heterogeneous mix of study conditions in which the daily study routine that supports efficacy is less uniformly available. This explanation is tentative and was not tested. These are descriptive patterns, and the boys' and girls' school groups are small.

Table 3. *Self-efficacy levels by subgroup (percentage within group)*

Group	Low	Moderate	High
Whole sample	45.2	25.5	29.3
Male	43.1	27.6	29.3
Female	47.3	23.4	29.3
Mixed schools	47.9	22.3	29.8
Boys' schools	29.4	43.1	27.5
Girls' schools	46.9	24.5	28.6
Day	37.5	29.2	33.3
Boarding	37.6	33.3	29.0
Day-and-boarding	55.9	17.8	26.3

Note. Moderate-category percentages are the remainder after the low and high categories. Categories describe relative standing within the sample and are not clinical or normative cut-offs.

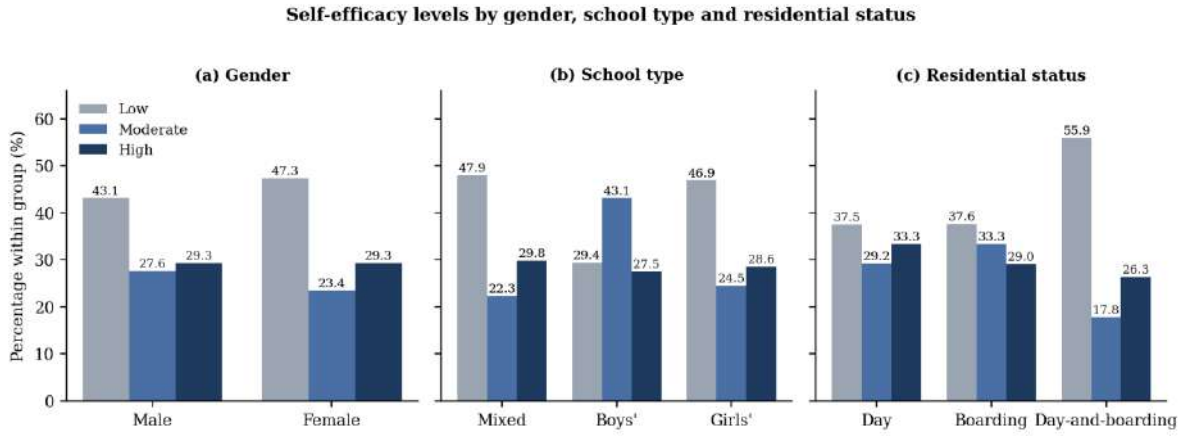


Figure 4. *Distribution of self-efficacy levels by gender, school type and residential status.*

4.4 Correlation between self-efficacy and attributional ambiguity

Table 4 presents the Pearson product-moment correlation. The correlation was very weak and negative ($r = -.049$, $p = .178$, one-tailed), and the 95% confidence interval, from −.151 to .054, includes zero. The coefficient of determination ($r^2 = .002$) indicates that about 0.2% of the variance in attributional ambiguity is shared with self-efficacy. The correlation is not statistically significant and is smaller than the benchmark for a small effect (Cohen, 1988). In this sample, confidence in the ability to complete academic tasks did not vary in any meaningful way with the degree of uncertainty students felt about the causes of their results.

Table 4. *Pearson correlation between self-efficacy and students' academic achievement level of attributional ambiguity*

Variable pair	r	95% CI for r	Sig. (1-tailed)	N
Self-efficacy and attributional ambiguity	−.049	[−.151, .054]	.178	365

Note. The 95% confidence interval was computed using Fisher's z transformation.

4.5 Regression analysis

The regression model was specified as $AA = a + b_1(SEF) + e$, where AA is attributional ambiguity and SEF is self-efficacy. Tables 5 to 7 present the model summary, analysis of variance and coefficients. Self-efficacy explained only 0.2% of the variance in attributional ambiguity ($R^2 = .002$, adjusted $R^2 = .000$), and the

model was not statistically significant, $F(1, 363) = .858$, $p = .355$. The unstandardized coefficient was $B = -.076$ ($SE = .082$), meaning that a one-unit increase in self-efficacy was associated with a non-significant decrease of 0.076 units in attributional ambiguity ($\beta = -.049$, $t = -.926$, $p = .355$). The 95% confidence interval for B, from −.238 to .085, straddles zero. The regression equation is AA = 61.752 − 0.076(SEF).

Table 5. *Model summary for self-efficacy predicting attributional ambiguity*

R	R^2	Adj. R^2	Std. error	ΔR^2	ΔF	df1	df2	Sig. ΔF
.049	.002	.000	18.520	.002	.858	1	363	.355

Note. Predictor: (Constant), self-efficacy. Dependent variable: attributional ambiguity.

Table 6. *Analysis of variance for the self-efficacy regression model*

Source	Sum of squares	df	Mean square	F	Sig.
Regression	294.124	1	294.124	.858	.355
Residual	124,506.051	363	342.992		
Total	124,800.175	364			

Note. Dependent variable: attributional ambiguity. Predictor: (Constant), self-efficacy.

Table 7. *Regression coefficients for self-efficacy predicting attributional ambiguity*

Variable	B	Std. error	β	t	Sig.	95% CI for B
(Constant)	61.752	6.918		8.926	< .001	
Self-efficacy	−.076	.082	−.049	−.926	.355	[−.238, .085]

Note. Dependent variable: attributional ambiguity.

The practical meaning of the coefficient can be illustrated with predicted values, shown in Figure 5. A student with the lowest observed self-efficacy score of 20 would be predicted to score 60.2 on attributional ambiguity, and a student with the highest score of 100 would be predicted to score 54.2. A difference of 6.0 points across an 80-point range of self-efficacy is about one third of a standard deviation of attributional ambiguity, and it is driven by the few extreme low scores, since for the great majority of students, whose scores lie between 70 and 100, the predicted difference is under 2.3 points. A difference of one standard deviation in self-efficacy corresponds to a change of about 0.90 points in attributional ambiguity, or 0.05 of its standard deviation (Cohen's $f^2 = .002$). The equation predicts 55.4 for a student at the mean self-efficacy score, which equals the observed mean of the dependent variable. The estimated effect is neither statistically nor practically important.

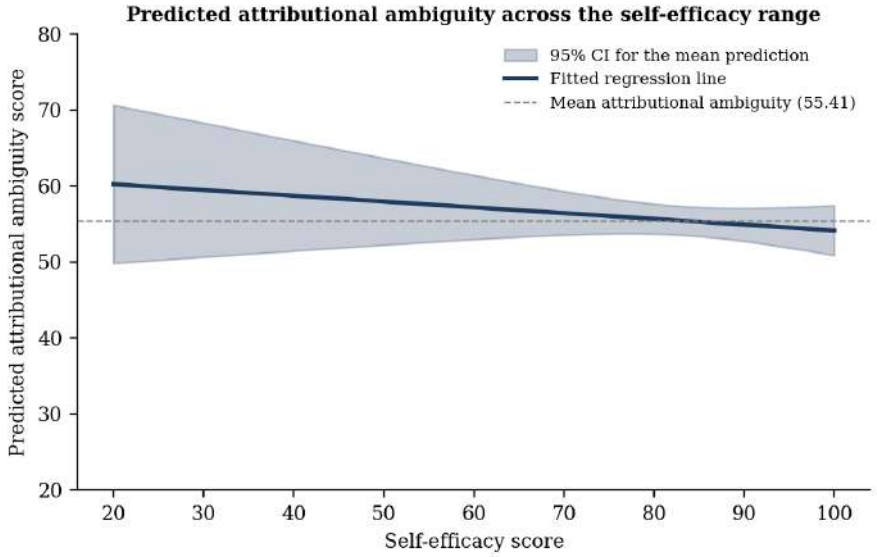


Figure 5. *Fitted regression line for self-efficacy predicting attributional ambiguity.* The line and the 95% confidence band for the mean prediction were computed from the coefficients and standard deviations reported in Tables 2 and 5 to 7; they are not a plot of the raw data.

4.6 Decision on the null hypothesis

Because the significance value of the regression model (p = .355) and the one-tailed significance value of the correlation (p = .178) both exceed .05, the null hypothesis H_{02} is retained. Self-efficacy has no statistically significant influence on students' academic achievement level of attributional ambiguity among Form Four students in Bomet East Sub-County.

V. DISCUSSION

The study asked whether self-efficacy influences students' academic achievement level of attributional ambiguity. The answer is that, in this sample, it does not. Self-efficacy was very weakly and non-significantly related to ambiguity (r = −.049, p = .178), explained 0.2% of its variance, and the confidence intervals for both the correlation and the regression coefficient included zero. The null hypothesis H_{02} was retained. The finding is a substantive result and not merely an absence of evidence. With a sample of 365 and power of about .82 to detect a correlation of .15, the observed coefficient of −.049 is far below any level of educational importance, and the narrow confidence interval rules out anything larger than a small association. The discussion considers three explanations, which the researchers argue operate together, and then compares the finding with the literature.

5.1 The first explanation: a ceiling effect

With a mean of 83.36 on a scale whose maximum is 100, and with a skewness of −1.235, most students clustered near the top of the scale, and a predictor that varies little among respondents has limited power to discriminate between those who are more and less ambiguous. Pajares and Urdan (2006) cautioned that self-report efficacy scales in student samples often produce ceiling effects, particularly among students who have experienced general academic success, and Form Four students who remain in school are precisely such a group. The ceiling effect is a plausible contributor but not a sufficient explanation on its own. The power analysis shows that the sample could detect a correlation of .15, and the observed correlation is far below that level, so the lack of association cannot be attributed to low power alone. The few extreme low scores that stretch the distribution also drive most of the small predicted difference of 6.0 points reported in Section 4.5, so the estimated slope is not carried by the bulk of the sample.

5.2 The second explanation: task confidence is not outcome interpretation

The second explanation is conceptual and, in the researchers' view, the more important. Bandura (1997) defined self-efficacy as a belief about capability to organize and execute the actions required to produce given attainments, and Bandura (2006) advised that efficacy be measured in relation to specific tasks. The items used here ask students how confident they are in completing assignments, organizing a study schedule, understanding difficult topics, solving challenging problems and maintaining concentration. These are beliefs about performing academic tasks. Attributional ambiguity, by contrast, concerns the interpretation of results after they have been received. A student may be entirely confident that he or she can study effectively and still be unable to say whether a particular mark reflects preparation, the difficulty of the paper or the marking. In Weiner's (1985) terms, self-efficacy is a belief that precedes the outcome, whereas an attribution is a judgment that follows it, and the two need not covary.

Social Cognitive Theory points the same way. It states that mastery experiences strengthen efficacy only when the student attributes success to his or her own effort and ability (Bandura, 1997), so that clear attribution is a condition of efficacy formation and not a product of it. If this is correct, attributional ambiguity is better viewed as an influence on the growth of self-efficacy than as its consequence, and a test in which self-efficacy is the predictor and ambiguity the outcome would be expected to give a weak result. This reading is consistent with the reciprocal logic of the theory (Bandura, 1986; Marsh & Craven, 2006), and it implies that the direction tested here may not be the dominant one. The cross-sectional design cannot settle the matter, but it does suggest that future work should model ambiguity as an antecedent of efficacy.

5.3 The third explanation: a shared feedback environment

The third explanation lies in the environment. Kariuki and Kimathi (2023) showed that vague or infrequent feedback in East African secondary schools is associated with lower and more variable self-efficacy, and Cao and Han (2024) and Riegel et al. (2025) reported that unclear or inconsistent assessment feedback reduced student confidence and increased confusion about academic standing. These studies point to the feedback environment as a common cause of both weak efficacy and confusion. Where all students in a sub-county are exposed to broadly the same summative and minimally explanatory feedback, as in the schools studied, differences in efficacy between individual students are unlikely to be closely tied to differences in ambiguity, because the main source of ambiguity is shared. Brandmo and Gamlem (2025), in a systematic review of students' perceptions of teacher feedback, similarly underline that the effects of feedback depend on

how students perceive and use it, and not only on how much feedback is given. This is also consistent with evidence that unclear assessment criteria and limited formative feedback in East African schools are associated with reduced clarity about one's own academic standing (Mkumbo & Amani, 2022). On this reading, ambiguity is partly a property of the assessment environment, and an individual-level belief such as self-efficacy would be expected to explain only a small part of it.

The practical lesson is that the source of ambiguity in these schools may lie less in what students believe about themselves than in what the assessment system tells them about their results. A confident student who receives only a score, with no marking scheme, no worked solution and no comment on the specific errors made, has little to work with when trying to explain the result, and a less confident student in the same position faces the identical difficulty. Interventions that act on the feedback environment may therefore reduce ambiguity across the board, whereas interventions that act on efficacy alone will leave this shared source untouched.

5.4 Comparison with studies reporting a link between weak efficacy and confusion

The finding differs from the expectation drawn from Luo et al. (2022) and Liu et al. (2020), who reported that students with weaker efficacy beliefs oscillated more between internal and external explanations of their performance when feedback was unclear. It also differs from AL-Qadri et al. (2024), who found greater confusion and disengagement among learners facing unclear academic expectations. Two reasons for the difference are offered. First, oscillation between internal and external explanations is not the same as uncertainty about causes, since a student may move between explanations while feeling sure about each in turn. Second, those studies were concerned with conditions in which unclear feedback had been identified as the problem, whereas the present study measured ambiguity as it occurs naturally in ordinary school life, where the range of feedback conditions across students is narrower. The comparison suggests that self-efficacy may moderate how students respond to an experimentally or situationally induced ambiguity without determining how much baseline ambiguity they report.

5.5 Comparison with the global and continental evidence on achievement

The global and continental evidence on self-efficacy has centered on achievement. Suartini (2023) confirmed a robust positive relationship between self-efficacy and academic achievement across ten international studies, and Huang (2023) established that self-efficacy protects academic resilience. Ajadi (2025) found that self-efficacy was significantly related to academic performance among 384 students in south-western Nigeria despite fluctuating national examination outcomes, and Benyoucef and Tabachi (2024) found high efficacy and a significant positive correlation with achievement among middle school students in Algeria. The present finding is consistent with these studies in showing that efficacy beliefs are high among secondary school students in examination-oriented systems. It departs from them in showing that efficacy is unrelated to interpretive uncertainty. The relationship between self-efficacy and achievement therefore does not automatically extend to the clarity with which achievement is understood.

There is also a methodological contrast that strengthens the finding. The cited studies related self-reported efficacy to performance recorded from official sources, whereas the present study related self-reported efficacy to another self-reported variable. Two measures collected from the same respondents on the same questionnaire tend to be more strongly correlated because of shared method variance. A null result under these conditions is, if anything, more convincing than a null result across separate sources, since any inflation from common method effects would have worked in favor of finding an association.

5.6 Implications for theory

Usher and Pajares (2008) and Schunk and DiBenedetto (2020) recognized that efficacy operates as a lens through which evaluative information is interpreted, but they did not specify what happens to causal reasoning when the information is itself unclear. The present study addresses this theoretical silence directly and finds that, within the range of efficacy observed here, the lens metaphor does not extend to the certainty of causal beliefs. Efficacy may influence what a student concludes about a result without influencing how sure the student is of the conclusion. This identifies a limit to Social Cognitive Theory as it applies to the interpretive step: the theory presupposes that students can interpret mastery experiences correctly, and the result suggests that this interpretive step should be treated as a separate variable and not as an assumption. In terms of the Weiner framework, the result suggests that self-efficacy is better located at the level of the content of attributions than at the level of the quality of the attributional process.

Zimmerman (2000) distinguished efficacy for performance from efficacy for self-regulated learning, and the general efficacy measure used here does not separate them. It is possible that a measure focused on self-regulatory efficacy, which is closer to the process of examining why a result occurred, would show a stronger association. The Bomet County Education Office (2024) reported comparatively weaker mean scores in mathematics and the physical sciences in the sub-county, which raises the possibility that efficacy is lower, and ambiguity higher, in those subjects specifically. Because the study measured general academic efficacy and

overall ambiguity, such subject-specific relationships would be averaged out. The researchers also note the cultural caution raised by Graham (1991): if Kenyan students draw on communal or spiritual explanations that sit outside Weiner's original categories, the ambiguity measure may capture uncertainty that is unrelated to personal capability.

5.7 Gaps addressed by the finding

The finding addresses the gaps identified in Section 2.4. As regards knowledge, it shows for the first time in a Kenyan rural secondary school population that self-efficacy does not predict attributional ambiguity, and it corrects the assumption, implicit in the regional literature on feedback and efficacy, that the confusion created by unclear feedback is a function of low efficacy. On the theoretical side, it identifies the limit to Social Cognitive Theory described above. Methodologically, it employs an efficacy measure and a separate ambiguity measure within one sample and analyzes them with regression, which the Kenyan studies reviewed had not done. As regards design, it draws on a larger and more representative sample than the single-school studies cited, although the cross-sectional and self-report nature of the data prevents conclusions about direction and about change over time.

VI. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Conclusions

The study concludes that self-efficacy does not significantly influence students' academic achievement level of attributional ambiguity among Form Four students in Bomet East Sub-County. Students can hold strong beliefs about their ability to complete academic tasks and yet remain uncertain about why their results turn out as they do, particularly in a high-stakes examination system in which many uncontrollable factors converge. Confidence in one's capability is therefore not a guarantee of clarity in interpreting outcomes. The high and fairly uniform confidence of the students is not associated with the clarity of their causal explanations, and ceiling effects, the difference between task confidence and outcome interpretation, and a shared feedback environment together account for the result.

6.2 Implications for practice

For practice, the finding indicates that building the confidence of students is not by itself a route to greater clarity about results. Efficacy-enhancing programs, such as study skills training and peer modeling, are valuable for their own purposes, but they should be accompanied by teaching students to analyze the reasons for their results, for example by linking marks to identifiable study behaviors and to specific features of the examination paper. Confidence without diagnostic insight leaves students self-assured but no more certain why they succeed or fail.

6.3 Recommendations

- *Teachers and school counselors* who run efficacy-building programs, such as study skills training and peer mentoring, should add an interpretive component in which students learn to link marks to specific study behaviors and to particular features of the paper. Attribution retraining sessions that teach students to distinguish the contribution of effort, strategy, task difficulty and chance would help to turn confidence into insight.
- *School principals* should encourage subject teachers to hold short post-examination review sessions in which the demands of each question and the common errors made are discussed openly. Because weaker performance has been reported in mathematics and the physical sciences (Bomet County Education Office, 2024), such sessions should be given priority in those subjects.
- *Teachers* should give specific, timely and criterion-referenced feedback, because the evidence suggests that the clarity of the evaluative environment matters alongside the strength of students' beliefs (Kariuki & Kimathi, 2023; Brandmo & Gamlem, 2025).
- *The Sub-County Education Office and the Ministry of Education* should evaluate guidance and counseling programs against the outcome of interpretive clarity as well as the outcome of confidence, and should consider this outcome when reviewing how examination results are reported to students.

6.4 Limitations

Several limitations qualify the interpretation. The design is cross-sectional, so the direction of influence cannot be established and the reciprocal models discussed in Section 2.2 remain plausible. All variables were self-reported on one instrument, which may have introduced social desirability and shared method variance, and which cannot capture subject-specific variation. The attributional ambiguity measure was developed for this study, and although it was reviewed by experts and piloted, it has not yet been validated beyond this sample. Self-efficacy was examined in a simple regression model, so the result describes its association with ambiguity taken singly and does not partition shared variance among other self-perceptual constructs. The categories used

in the subgroup figures are relative to the sample, and the boys' and girls' school groups are small. Finally, the study was confined to Form Four students in public secondary schools in one sub-county, and the findings should be generalized with caution. These limits do not undermine the main finding, which is supported by adequate power, a complete dataset and a plausible theoretical account, but they indicate where caution is needed.

6.5 Suggestions for further research

- Longitudinal designs that follow students from Form One to Form Four to establish the direction of influence between self-efficacy and attributional ambiguity, including whether ambiguity undermines the growth of efficacy.
- Subject-specific measures of self-efficacy and attributional ambiguity, particularly in mathematics and the physical sciences, and measures that separate efficacy for performance from efficacy for self-regulation.
- Multiple regression and structural equation modeling to test whether self-efficacy operates indirectly or interacts with other beliefs and with the quality of feedback.
- Mixed-methods designs that include the perspectives of teachers, counselors and parents, and intervention studies testing whether attribution retraining and improved feedback reduce ambiguity among Form Four students.
- Replication in urban and private schools and in other counties to test generalizability.

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