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Evaluating the Longitudinal Impact of a Data-Driven Remedial Intervention on English Studies Performance: Evidence from a Nigerian Secondary School

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ABSTRACT

This study examined the impact of the Academic Booster Class (ABC), a data-driven remedial intervention, on the English Studies performance of students at Landmark College Ikorodu, Lagos, Nigeria. Employing a retrospective ex post facto design with longitudinal performance tracking, records of 100 students who participated in the ABC between 2021 and 2025 were analysed. Pre-intervention, immediate post-intervention, and follow-up scores were extracted from the school's Student Performance Review software. Descriptive statistics revealed a substantial rise in mean scores from 44.32 (SD = 8.51) at baseline to 67.84 (SD = 7.92) after remediation, with further improvement to 71.29 (SD = 8.04) at follow-up. Paired-samples t-tests confirmed statistically significant differences across all three assessment points ($p < .001$), accompanied by large effect sizes (Cohen's d ranging from 1.17 to 3.75). The findings demonstrate that the ABC model, which combines diagnostic identification of topic-level deficiencies, targeted re-teaching, and systematic reassessment, produces both immediate and sustained gains in English Studies. The study concludes that institutionally embedded, technology-supported remedial programmes can effectively address persistent underperformance and recommends the wider adoption of similar structured interventions across Nigerian secondary schools seeking evidence-based strategies for raising English proficiency.

Keywords: Academic Booster Class; English Studies; Longitudinal Analysis; Remedial Intervention; Student Performance.

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I. INTRODUCTION

Proficiency in English occupies a structurally decisive position in Nigerian secondary education because English functions simultaneously as the medium of instruction, the language of formal assessment, and the principal language of official communication (Adegbite, 2020; Olaofe, 2013). Under these conditions, weak performance in English Studies is rarely confined to a single subject; it constrains students' access to content across the curriculum and their prospects in high-stakes examinations. Recent school-level evidence from Lagos indicates that declining English examination performance can affect even students previously classified as high achievers (Olorunfemi et al., 2025). Schools have responded to persistent underachievement by introducing supplementary instruction in the form of extra lessons, catch-up classes, and booster sessions. The proliferation of such arrangements, however, has not been matched by rigorous evaluation. A recent Nigerian survey of primary pupils found that most participants reported satisfaction with extra lessons, yet also identified dissatisfaction when sessions became excessively long and cautioned that poorly implemented programmes may harm wellbeing and learning (Nwosu et al., 2024). Perceptions of this kind are informative, but they do not establish whether supplementary instruction produces measurable and durable gains in achievement.

International research offers a more developed, although far from uniform, evidence base on targeted academic support. Meta-analytic work on mastery learning reported positive effects of corrective instruction organised around diagnostic testing and re-teaching (Kulik et al., 1990), whereas Slavin (1987) cautioned that such effects were considerably smaller when outcomes were measured with standardised rather than programme-specific tests. More recent syntheses of rigorous experimental studies report consistently positive but moderate effects: tutoring programmes for PreK–12 learners produced a pooled effect of approximately 0.29 standard deviations (Nickow et al., 2024), and small-group tutoring for struggling readers yielded a weighted effect of approximately 0.24 standard deviations (Neitzel et al., 2022). Large-scale evaluations of "Teaching at the Right Level" in India further suggest that instruction targeted at children's actual learning level, rather than at the prescribed curriculum,

can improve foundational skills when implementation is carefully adapted to institutional realities (Banerjee et al., 2017). Taken together, these studies indicate that targeted remediation can be effective, while also showing that the magnitude of credible effects depends heavily on design quality, outcome measures, and implementation conditions.

Diagnostic and formative assessment provides the mechanism through which such targeting is expected to operate. Assessment for learning uses evidence of students' current understanding to adjust instruction and to support learners' regulation of their own progress (Heritage, 2018; Black & Wiliam, 2018). Response-to-intervention frameworks similarly emphasise early identification, focused instruction, and continuous progress monitoring as interdependent components rather than isolated practices (Fuchs & Fuchs, 2017). Within Nigeria, a quasi-experimental study in secondary school economics found that diagnostic testing improved achievement only when it was accompanied by feedback and remediation (Esomonu & Eleje, 2020), suggesting that diagnosis alone is insufficient unless it is translated into instructional response. These strands converge with Bloom's mastery-learning theory, which proposes that most learners can attain high levels of achievement when they receive sufficient time, corrective feedback, and re-teaching followed by re-assessment (Bloom, 1968, 1984). Vygotsky's (1978) concept of the Zone of Proximal Development complements this account by explaining how scaffolded support, gradually withdrawn, may enable learners to perform independently what they previously accomplished only with assistance.

The Academic Booster Class (ABC) at Landmark College, Ikorodu, Lagos, operationalises these principles within a single institutional system. Students are identified through the school's Student Performance Review (SPR) software, which aggregates continuous assessment and examination scores and flags deficiencies at the level of specific topics rather than the subject as a whole. Students whose performance falls below the institutional distinction benchmark receive intensive re-teaching on the topics previously failed and are subsequently reassessed to confirm mastery. Conceptually, this sequence maps onto the diagnostic pre-assessment, corrective instruction, and re-testing cycle described in mastery-learning theory, while its small-group, scaffolded format corresponds to instruction within learners' Zone of Proximal Development. Whether this design produces measurable and sustained improvement, however, remains an empirical question. The programme has operated since 2021 without a systematic evaluation, and institutional confidence in its effectiveness has so far rested on informal impressions rather than on analysed performance records.

The existing literature leaves three related gaps that the present study addresses. Empirically, Nigerian studies of supplementary instruction have largely examined generic extra-lesson arrangements or students' perceptions of them (Nwosu et al., 2024), and evidence on topic-level, data-driven remediation linked to digital diagnostic systems remains limited. Methodologically, many evaluations rely on short pre–post comparisons within a single term, which cannot indicate whether gains persist once intensive support is withdrawn; single-group designs are also vulnerable to regression to the mean, maturation, and testing effects that are seldom acknowledged (Marsden & Torgerson, 2012). Contextually, little is known about how such programmes perform in Nigerian private secondary schools that possess digital performance-tracking infrastructure. Accordingly, this study examines students' English Studies performance before, immediately after, and one term after participation in the ABC, using five years of institutional records (2021–2025). It addresses three research questions: (1) What is the baseline English Studies performance of students placed in the ABC? (2) To what extent does performance change from baseline to the immediate post-remediation assessment? (3) To what extent are post-remediation changes maintained at the follow-up assessment?

II. RESEARCH METHODS

This study employed a quantitative, retrospective single-group design with three repeated measurements drawn from existing institutional records. Because the ABC had already been implemented for several years and no variables were manipulated by the researchers, the design is best described as a retrospective pre–post–follow-up evaluation, which some methodological texts classify within ex post facto research (Creswell & Creswell, 2018; Fraenkel et al., 2019). The design permits description of within-student change across time, but it does not include a concurrent comparison group and therefore cannot by itself support causal attribution of observed changes to the intervention (Marsden & Torgerson, 2012). This limitation is addressed explicitly in the interpretation of findings.

The temporal scope of the records, spanning five academic years, was considered advantageous because it allowed several successive cohorts of ABC participants to be pooled rather than relying on a single intake.

The study was conducted at Landmark College, a private secondary school in Ikorodu, Lagos State, Nigeria. The target population comprised all students who participated in the ABC between 2021 and 2025. Institutional records indicate that approximately 30–50 students enrolled in the programme each year because they had not met the school's benchmark in English Studies, giving an estimated total of approximately 230 participants over the five-year period. The analytic sample consisted of 100 students who met three criteria: (a) participation in the ABC between 2021 and 2025; (b) availability of complete digital performance records at all three assessment points; and (c) completion of the formal reassessment after the intervention. Because inclusion was determined by record completeness rather than by researcher judgement, the sampling procedure is more accurately described as complete-case selection than as purposive sampling. Approximately 57% of the estimated population was therefore excluded, and the possibility that excluded students differed systematically from those retained is considered in the limitations.

Data consisted of students' English Studies scores extracted from the SPR software at three points. Pre-ABC scores comprised test and examination scores recorded before participation in the programme. Post-ABC scores were the formal reassessment scores recorded immediately after targeted remediation. Follow-up scores were students' English Studies scores in the term immediately following the intervention. Students were referred to the ABC through a dual criterion: the SPR algorithm flagged a topic as deficient when a student's cumulative performance on items mapped to that topic fell below 50 per cent across the continuous-assessment and examination windows constituting the diagnostic period, and only students whose overall English Studies mean also fell below the institutional distinction threshold (typically 60 per cent) were enrolled. It should be noted that the three measures are not identical instruments. The post-ABC reassessment targets remediated topics, whereas the follow-up score reflects regular term assessment, and the comparability of score scales across these instruments therefore warrants caution.

The validity of the scores was supported by the school's internal quality-assurance procedures. Assessment items were constructed by subject specialists and mapped to the prescribed English Studies curriculum, reviewed by departmental panels for content alignment and difficulty balance, and administered under standardised conditions. The quality-assurance unit sampled marked scripts for inter-rater checks, and item banks were reportedly recalibrated periodically during the five-year period to maintain comparable difficulty. The SPR software applies standardised scoring procedures and flags anomalous score patterns for manual review, and extracted records were cross-checked against teachers' grade books and cumulative term records. These procedures strengthen confidence in the accuracy of the archived data, but they do not constitute formal psychometric evidence. The absence of an external standardised measure of English proficiency is acknowledged as a limitation, particularly because programme-specific assessments tend to yield larger effects than standardised outcome measures (Slavin, 1987).

Data were collected in collaboration with the academic unit and the ICT department of the school after formal permission was obtained from the school management. Records were extracted directly from the SPR software, sorted into the three assessment categories, and organised into a structured data file. Student identities were replaced with unique codes before analysis, access to the SPR database was restricted to authorised personnel under a data-use agreement with the school management, and only de-identified score matrices were exported from the institutional environment. Data were analysed using descriptive statistics (means and standard deviations) and paired-samples t-tests, which are appropriate for comparing two related measurements obtained from the same participants (Pallant, 2020). Three null hypotheses were tested at the .05 level: no difference between pre-ABC and post-ABC scores (H_{01}), between pre-ABC and follow-up scores (H_{02}), and between post-ABC and follow-up scores (H_{03}). Effect sizes were computed as Cohen's d for paired observations, that is, the mean difference divided by the standard deviation of the difference scores (d_z), which is distinct from standardised mean differences based on the pooled or average standard deviation (Lakens, 2013).

III. RESULTS AND DISCUSSION

Table 1 summarises students' English Studies performance at the three assessment points. Students entered the ABC with a mean score of 44.32 (SD = 8.51), well below the institutional distinction threshold. The mean rose

to 67.84 (*SD* = 7.92) at the immediate post-ABC reassessment, a difference of 23.52 points, and reached 71.29 (*SD* = 8.04) at follow-up, which is 26.97 points above baseline and 3.45 points above the post-ABC mean. Standard deviations remained within a narrow range of approximately eight points across all three occasions, indicating that the distribution shifted upward without marked changes in dispersion. The descriptive pattern therefore shows a large increase between baseline and the immediate reassessment, followed by a smaller further increase at follow-up. These results answer the first research question by documenting a low baseline level and provide the descriptive basis for the inferential tests reported below.

Table 1. Descriptive Statistics for English Studies Performance at Three Assessment Points ($N = 100$)

Assessment point	*M*	*SD*	Mean difference from baseline
Pre-ABC (baseline)	44.32	8.51	—
Post-ABC (immediate)	67.84	7.92	23.52
Follow-up (subsequent term)	71.29	8.04	26.97

Note. The mean difference between the post-ABC and follow-up assessments is 3.45 points. Source: Institutional records, Landmark College, 2021–2025.

Paired-samples t-tests were conducted to examine whether the mean differences were statistically significant (Table 2). The pre-ABC to post-ABC difference was significant, $t(99) = 34.17$, $p < .001$, $d_z = 3.42$; therefore, H_{01} was rejected. The pre-ABC to follow-up difference was also significant, $t(99) = 37.47$, $p < .001$, $d_z = 3.75$, leading to the rejection of H_{02}. The smaller post-ABC to follow-up difference was significant as well, $t(99) = 11.65$, $p < .001$, $d_z = 1.17$, and H_{03} was rejected. Because three related comparisons were tested, the conventional alpha level could be adjusted for multiple testing; however, all *p* values were below .001, so a Bonferroni-corrected criterion of .017 would not alter any conclusion. Taken together, the inferential results indicate that students' scores at both later assessment points were reliably higher than at baseline and that follow-up scores were, on average, slightly higher than immediate post-remediation scores.

Table 2. Paired-Samples t-Tests Comparing English Studies Scores across Assessment Points ($N = 100$)

Comparison	M_{diff}	SD_{diff}	*t*	*df*	*p*	d_z
Pre-ABC vs. Post-ABC	23.52	6.88	34.17	99	< .001	3.42
Pre-ABC vs. Follow-up	26.97	7.20	37.47	99	< .001	3.75
Post-ABC vs. Follow-up	3.45	2.96	11.65	99	< .001	1.17

Note. M_{diff} = mean difference; SD_{diff} = standard deviation of the difference scores; $d_z = M_{diff} / SD_{diff}$ (Cohen's d for paired observations). Source: Institutional records, Landmark College, 2021–2025.

Magnitude and Meaning of the Immediate Gains

The first major finding is that students' scores rose substantially between referral and the post-remediation reassessment. This pattern is consistent with mastery-learning theory, which predicts that diagnostic identification of deficiencies followed by corrective re-teaching and re-testing will raise achievement among students who initially fall short of mastery (Bloom, 1984; Kulik et al., 1990). It also accords with Nigerian evidence that diagnostic assessment improves achievement when it is coupled with feedback and remediation (Esomonu & Eleje, 2020). Nevertheless, the size of the reported effects requires careful interpretation. The d_z statistic standardises the mean change by the standard deviation of difference scores and is inflated relative to between-group standardised mean differences when repeated measures are highly correlated (Lakens, 2013). Comparing d_z values of 3.42 and 3.75 with Cohen's (1988) conventional benchmarks, or with average effects reported in meta-analyses such as Hattie (2009), is therefore not a like-for-like comparison and is likely to overstate the practical magnitude of change.

Even allowing for this metric difference, the observed gains are considerably larger than effects typically reported in rigorous evaluations of academic interventions. Kraft (2020) shows that effects of field-based education interventions on standardised achievement measures are usually far smaller than Cohen's benchmarks imply, and recent meta-analyses report pooled effects of approximately 0.24 to 0.29 standard deviations for tutoring and small-group reading support (Neitzel et al., 2022; Nickow et al., 2024). Two features of the present design plausibly contribute to the larger gains. First, students were selected precisely because their scores fell below a threshold, so

part of the subsequent increase may reflect regression to the mean rather than intervention effects (Marsden & Torgerson, 2012). Second, the post-ABC reassessment targeted the very topics that had just been re-taught, making it a proximal, programme-aligned measure; such measures tend to produce larger effects than broader standardised outcomes (Slavin, 1987). The immediate gains are therefore best interpreted as evidence of improved performance on remediated content, with the intervention's independent contribution remaining to be estimated.

Maintenance of Gains after Remediation

The second finding concerns the durability of improvement. Follow-up scores, recorded during the term after the intervention, were not only higher than baseline but also slightly higher than immediate post-remediation scores. This pattern argues against a simple account in which gains on the reassessment rapidly dissipate once intensive support is withdrawn. It is consistent with the proposition, derived from mastery-learning theory, that students who consolidate prerequisite skills are better positioned to benefit from subsequent instruction (Bloom, 1968). It is also compatible with Vygotsky's (1978) account of learning within the Zone of Proximal Development, in which competencies first exercised with scaffolding may later be performed independently. These theoretical readings should, however, be treated as plausible interpretations rather than tested mechanisms, because the study did not measure scaffolding, metacognitive strategies, or study habits directly. The finding extends previous Nigerian work, which has largely examined perceptions of extra lessons (Nwosu et al., 2024), by providing record-based evidence that improvements in English Studies were maintained over at least one subsequent term.

The post-ABC to follow-up increase requires particular caution. Expressed relative to the average of the two standard deviations, the mean difference of 3.45 points is modest, and its d_z value of 1.17 largely reflects the high stability of individual scores between the two occasions rather than a large shift in absolute performance (Lakens, 2013). Moreover, in the absence of a comparison group, this increment cannot be separated from maturation, cumulative exposure to English across the curriculum, differences in difficulty between the reassessment and regular term assessments, or unmeasured supports such as private tutoring (Marsden & Torgerson, 2012). Pooling records across five academic years reduces the likelihood that the results reflect the idiosyncrasies of a single cohort, but it does not address regression to the mean, which arises from selection on low scores rather than from cohort composition. The most defensible conclusion is that gains were maintained, while the further increase observed at follow-up should not be attributed specifically to the ABC without stronger comparative evidence.

The findings should also be read in light of the institutional context in which the programme operated. Landmark College is a private school with digital performance-tracking infrastructure, relatively small remedial groups, and teachers able to deliver topic-level small-group instruction. These conditions are not uniformly available in Nigerian public schools, and the magnitude of change observed here is likely to be contingent, at least in part, on them. What appears more transferable is the underlying design logic: identifying specific learning gaps, responding with focused instruction, and verifying progress through reassessment, which is consistent with response-to-intervention principles and with evidence on instruction targeted at learners' actual level (Fuchs & Fuchs, 2017; Banerjee et al., 2017). A further implication concerns institutional evaluation capacity. The SPR system not only supported referral decisions but also generated the longitudinal records that made this analysis possible, suggesting that schools investing in comparable systems may move from anecdotal claims toward cumulative, evidence-informed programme review, provided that comparison groups and external outcome measures are built into future evaluation designs.

IV. CONCLUSION

This study examined changes in English Studies performance among 100 students who participated in the Academic Booster Class at Landmark College, Lagos, between 2021 and 2025. Students' mean scores increased from 44.32 at baseline to 67.84 at the immediate post-remediation reassessment and to 71.29 at follow-up, and all three pairwise differences were statistically significant. These findings indicate that participation in a diagnostic, topic-focused remedial programme was associated with substantial improvement on remediated content and that this improvement was maintained during the subsequent term. Theoretically, the results are consistent with mastery-learning and Zone of Proximal Development accounts of remediation, while also illustrating that within-subject effect sizes and programme-aligned outcome measures can substantially inflate apparent effects. Contextually, the study contributes record-based longitudinal evidence from a Nigerian private secondary school,

a setting in which evaluations of data-driven remediation remain scarce. Practically, the findings support continuing the ABC and strengthening teachers' competencies in diagnostic assessment and targeted instruction, while any extension to other subjects or schools should be accompanied by systematic evaluation rather than assumed effectiveness.

Several limitations bound these conclusions. The single-group design without a concurrent comparison group does not permit causal attribution, and the observed gains may partly reflect regression to the mean, maturation, and concurrent instruction. The analysis relied exclusively on institutionally generated assessments whose comparability across occasions and whose reliability were not formally established, and no external standardised measure of English proficiency was available. Complete-case selection excluded more than half of the estimated participant population, which may have introduced selection bias if excluded students differed systematically from those retained. Qualitative dimensions of implementation, including teacher fidelity, student engagement, and parental support, were not examined. Future research should therefore employ matched comparison groups or a regression-discontinuity design around the referral threshold, include standardised external outcome measures, report reliability evidence and effect sizes based on the average standard deviation, and integrate qualitative data on implementation processes. Such designs would allow the independent contribution of the ABC to be estimated with greater confidence and would clarify the conditions under which similar programmes can be adapted to resource-constrained public schools.

V. AUTHOR CONTRIBUTIONS

Conceptualization, methodology, formal analysis, investigation, writing original draft, and writing review and editing were undertaken by the authors as a collaborative team. All authors have read and agreed to the published version of the manuscript.

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This research received no external funding.

VIII. ETHICS STATEMENT

Ethical approval was obtained from the Management of Landmark College, Ikorodu, Lagos, Nigeria. All the participants provided informed consent prior to data collection

IX. DATA AVAILABILITY STATEMENT

The quantitative dataset supporting the findings of this study is available from the corresponding author upon reasonable request, subject to ethical restrictions protecting participant anonymity.

X. CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

XI. GENERATIVE AI STATEMENT

The authors declare that ChatGPT was used solely for language refinement (grammar and spelling only) during the preparation of this study. The authors independently conceived the study, developed the framework, evaluated the content and methodology, and take full responsibility for the accuracy, originality, and integrity of the work. The authors retain ownership of the paper and its intellectual content.

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