

Research Article

From Mobile Practice to Course Incentives: Integrating Duolingo to Support English Achievement and Self-Regulated Learning

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ABSTRACT

Mobile-assisted language learning can extend English practice beyond the classroom, yet sustained engagement with supplementary applications remains a challenge in university EFL contexts. This study examined whether integrating Duolingo with incentive-based grading was associated with improvements in English achievement and self-regulated learning (SRL). A three-week quasi-experimental pretest–posttest non-equivalent control group design was implemented with 21 university students, comprising 11 students in the experimental group and 10 in the control group. The experimental group received regular English instruction supplemented with Duolingo activities linked to academic incentives, whereas the control group received regular instruction only. English achievement was measured using a 40-item TOEIC-informed achievement test, while SRL was assessed using an adapted EFL Self-Regulated Learning Questionnaire. Paired-samples tests, gain-score comparisons, and ANCOVA were employed, with ANCOVA serving as the primary between-group analysis. English achievement increased significantly in both groups, although the experimental group showed a larger mean gain. After controlling for baseline achievement, the adjusted posttest mean favored the experimental group, ($F(1,18)=4.318$), ($p=.052$), partial ($\eta^2=.193$), but did not reach the conventional significance threshold. SRL increased significantly within the experimental group, but the baseline-adjusted between-group effect was negligible, ($F(1,18)=0.171$), ($p=.684$), partial ($\eta^2=.009$). The findings provide promising but inconclusive evidence that integrating Duolingo with course-based incentives may offer short-term benefits for English achievement, while broader SRL development may require more sustained intervention.

Keywords: Duolingo; English Achievement; Incentive-Based Grading; Mobile-Assisted Language Learning; Self-Regulated Learning.

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1. Introduction

Developing English competence in higher education requires learning opportunities that extend beyond the temporal and spatial constraints of formal classroom instruction, particularly in English as a foreign language (EFL) context where exposure to English outside scheduled courses may be limited. Mobile-assisted language learning (MALL) has therefore become an important means of connecting classroom instruction with flexible out-of-class practice by allowing students to access resources, practise at their own pace, and continue learning through personal mobile devices. Research suggests that mobile-supported environments can facilitate self-

directed learning and provide additional opportunities for active language practice in higher education (Jeong, 2022; Lai et al., 2022; Liu et al., 2024). Their educational value, however, appears strongest when mobile technologies are deliberately integrated into instructional design rather than treated merely as optional supplements (Chulerk et al., 2025).

Among MALL applications, Duolingo has attracted substantial attention because it combines ubiquitous access with gamified, self-paced language practice. Its environment incorporates repeated exercises, immediate feedback, progress indicators, levels, and other gamification features that make learning activity visible and allow learners considerable control over when and how they practise (Shortt et al., 2021; Li & Bonk, 2023). Empirical evidence generally supports its potential for language development. Studies have reported gains in reading and listening proficiency as well as receptive and productive language knowledge following sustained Duolingo use (Jiang et al., 2024; Smith et al., 2024). Nevertheless, outcomes are not uniformly strong: Kessler et al. (2023) found comparable gains among Duolingo and Babbel users without establishing clear superiority for either application, while Sudina and Plonsky (2023) showed that learning outcomes may depend on the frequency, duration, and intensity of application use. Thus, access to Duolingo creates learning opportunities, but the benefits of those opportunities depend partly on how consistently learners engage with them.

This distinction between access to learning opportunities and sustained engagement with them is particularly important in self-directed digital environments. Mobile learning provides autonomy, but autonomy simultaneously requires learners to initiate practice, allocate time and effort, monitor progress, and persist without continuous teacher supervision. Research on mobile language learning indicates that learners use cognitive and metacognitive strategies to regulate such activity, while Duolingo studies similarly emphasize resource management and self-directed engagement (Lai et al., 2022; Li & Bonk, 2023). Yet supplementary digital resources may remain underused when they compete with activities directly connected to formal assessment (Glushenkova et al., 2025). External structuring mechanisms have accordingly been shown to influence engagement, self-regulation, and procrastination in technology-mediated learning environments (Mumcu & Çebi, 2025).

One possible response is to connect supplementary practice with the course grading structure. Grades can function not only as evaluations of completed performance but also as signals that direct students' effort toward educationally valued activities. YeckehZaare and Resnick (2025), for example, demonstrated that changing how course points were earned altered students' practice behavior: rewarding practice distributed across different days encouraged more sustained engagement and, under conditions, contributed to improved examination performance. Importantly, such incentives need not eliminate learner autonomy because students may still decide when and how to undertake the incentivized activity. Carefully designed grading structures may therefore operate as behavioral scaffolds that increase the salience of supplementary practice while preserving meaningful learner control.

This possibility is especially relevant to self-regulated learning (SRL), which involves active regulation of goals, planning, monitoring, self-evaluation, attention, effort, strategies, and the learning environment. Technology-mediated language environments may support these processes through flexible access, feedback, visible progress, and repeated opportunities for learner-directed decision making. Consistent with this view, Fathi, Ahmadnejad, and Nosrati (2024) reported positive effects of Duolingo-based instruction on both foreign-language achievement and SRL after controlling for baseline performance. Related research on gamified and mobile-supported English learning also suggests potential relationships among technology use, learner regulation, engagement,

and language outcomes (Waluyo et al., 2024; Li & Bonk, 2023). Nevertheless, externally structured participation should not be equated automatically with internal self-regulation; the two processes are related but conceptually distinct.

An important research space therefore remains between two largely separate lines of inquiry. Duolingo research has primarily examined proficiency, user experience, usage intensity, gamification, self-directed learning, and SRL (Shortt et al., 2021; Kessler et al., 2023; Sudina & Plonsky, 2023; Li & Bonk, 2023; Fathi et al., 2024), whereas evidence that grading incentives can shape learning behavior has largely developed outside university EFL contexts (YeckehZaare & Resnick, 2025). Consequently, it remains insufficiently understood whether deliberately linking Duolingo participation to course-based academic incentives can simultaneously support language achievement and self-regulatory development. Examining both outcomes is important because achievement may respond relatively directly to increased opportunities for language practice, whereas broader SRL may require more sustained changes in learners' planning, monitoring, persistence, and management of learning.

Accordingly, the present study examines an integrated Duolingo–incentive-based grading intervention in a university English course. Students in the experimental condition supplemented regular English instruction with Duolingo activities whose unit completion contributed proportionally to a designated component of the final course grade, whereas the control group received regular English instruction without Duolingo or the associated grading mechanism. Using a pretest–posttest non-equivalent control group design, the study evaluates English achievement and SRL as two distinct outcomes. Rather than isolating the individual effects of Duolingo and grading incentives, the study evaluates the integrated instructional package and extends existing research by examining the pedagogical structuring of mobile language learning through course-based incentives in a university EFL context.

The study was guided by the following research questions:

1. RQ1. To what extent does integrating Duolingo with incentive-based grading affect university students' English achievement compared with regular English instruction?
2. RQ2. To what extent does integrating Duolingo with incentive-based grading affect university students' self-regulated learning compared with regular English instruction?

2. Literature Review

2.1 Mobile-Assisted Language Learning and Duolingo in EFL Learning

Mobile-assisted language learning (MALL) extends language-learning opportunities beyond conventional classroom boundaries by enabling learners to access resources, practise language, and manage learning activities through portable digital technologies. Its pedagogical value, however, lies not simply in mobility or accessibility but in the ways mobile affordances are aligned with instructional goals and learner needs. Research in higher education has shown that mobile environments can facilitate self-directed learning by providing flexible access to learning resources and allowing students greater control over the timing and location of practice (Jeong, 2022; Lai et al., 2022). Such environments can also connect formal and informal language learning, allowing activities undertaken outside the classroom to complement institutionally organized instruction rather than operate as disconnected extracurricular experiences (Bruen & Erdocia, 2024). At a broader level, evidence syntheses indicate positive effects of mobile learning on academic achievement, although these effects vary according to instructional design, educational context, and how mobile technologies are embedded

into learning activities (Yang & Xiang, 2024). Accordingly, the instructional effectiveness of MALL is better understood as a product of pedagogically structured mobile practice than of technology access alone.

Duolingo represents a particularly relevant MALL environment because it combines self-paced language practice with gamification features such as experience points (XP), progress indicators, levels, feedback, and repeated short learning activities. These features can make learning progress more visible and provide learners with frequent opportunities to practise while retaining substantial control over the pace and timing of their activity (Shortt et al., 2021; Li & Bonk, 2023). The potential value of this environment extends beyond language exposure because progress indicators and feedback may also support monitoring and reflection, both of which are relevant to learner regulation. Nevertheless, empirical evidence cautions against assuming that gamified access automatically translates into superior learning outcomes. Studies of Duolingo have reported positive language-development outcomes, but the magnitude of gains can vary with learners' frequency, duration, and intensity of application use (Sudina & Plonsky, 2023), while comparative research suggests that learning gains may not always distinguish Duolingo clearly from alternative mobile applications (Kessler et al., 2023). Research also indicates that Duolingo can support self-directed and self-regulated learning when learners actively manage their resources, monitor progress, and sustain engagement (Li & Bonk, 2023; Fathi et al., 2024). Collectively, these findings shift the relevant pedagogical question from whether Duolingo can support language learning to how its learning opportunities can be structured so that students engage with them sufficiently and consistently.

2.2 Incentive-Based Grading and Learning Engagement

Academic incentives provide one mechanism for structuring such engagement because grading systems can influence how students prioritize learning activities and allocate limited time and effort. From this perspective, grades are not solely retrospective evaluations of performance; they can also operate prospectively by signaling which learning behaviors carry academic value. YeckehZaare and Resnick (2025) demonstrated this principle experimentally by changing the structure through which students earned course points: rewarding practice distributed across days altered students' practice patterns and, under particular conditions, improved subsequent performance. Evidence from other gamified educational environments similarly suggests that externally structured activities can increase student participation and that greater engagement with formative learning resources can be associated with stronger academic outcomes (Aldalou et al., 2025; James et al., 2024). Technology-mediated behavioral interventions, including nudges and engagement platforms, have likewise shown that external structures can help students maintain participation when voluntary engagement might otherwise decline (Bostock, 2023; Sengupta & Williams, 2021). The important distinction, therefore, is not simply between rewarded and unrewarded learning, but between different incentive architectures and the learning behaviors they are designed to encourage.

External incentives nevertheless create a theoretical tension when combined with learning environments valued for learner autonomy. An incentive that is overly controlling may shift attention toward reward attainment, whereas a structure that establishes meaningful goals while preserving learner choice may provide guidance without eliminating agency. Meta-analytic evidence supports this more differentiated interpretation: Li et al. (2024) found that gamification produced positive effects on perceived autonomy and relatedness as well as a smaller positive effect on intrinsic motivation, although its impact on perceived competence was comparatively limited. Recent evidence also shows that reward effectiveness depends on how rewards are

designed and made contingent on performance; Bai et al.'s (2026) systematic review found considerable variation across reward structures and identified potentially more favorable outcomes for particular combinations of reward contingency and stakes. Similarly, a longitudinal quasi-experiment by Maimaiti and Hew (2025) showed that gamification could strengthen learning performance and overall self-regulated learning rather than merely generate short-lived participation. In mobile English learning specifically, perceived autonomy has also been identified as relevant to learners' willingness to engage with mobile technologies (Bali et al., 2024). These findings support viewing well-designed incentive-based learning as a form of structured autonomy, in which the course provides an external reason and target for participation while learners retain meaningful control over how they pursue that target.

2.3 Self-Regulated Learning in Technology-Mediated Language Learning

Self-regulated learning (SRL) is particularly important in foreign-language learning because successful development often requires learners to sustain practice beyond periods of direct teacher supervision. SRL is not a single behavior but a multidimensional process involving the regulation of motivation, goals, strategies, attention, effort, monitoring, evaluation, and learning environments. In an EFL-specific operationalization, Salehi and Jafari (2015) identified 13 dimensions encompassing intrinsic motivation, self-efficacy, locus of control orientation, attitude, organization, memory strategies, self-monitoring, self-evaluation, planning and goal setting, concentration and sustained attention, effort regulation, regulation of the environment, and help seeking. At the same time, applied-linguistics scholarship has cautioned against transferring generic models of self-regulation into language learning without considering the specific knowledge and activities that learners are attempting to regulate. Teng and Zhang (2022), for example, identify conceptual and methodological challenges in applying SRL to second- and foreign-language learning, while Bowen and Thomas (2022) argue that regulatory processes should remain connected to the language knowledge and practices toward which regulation is directed. SRL in EFL should therefore be understood not simply as independence from the teacher, but as learners' capacity to organize and sustain purposeful engagement with language-learning demands.

Technology-mediated environments can provide resources for such regulation, but they do not guarantee that learners will use those resources strategically. Flexible access may facilitate planning and time management; immediate feedback can support monitoring and evaluation; visible progress may contribute to goal monitoring; and repeated opportunities for practice can provide contexts in which learners regulate effort and persistence. Research on mobile and gamified language learning has consequently identified relationships among technology use, self-directed learning, self-regulatory strategies, and engagement (Li & Bonk, 2023; Waluyo et al., 2024). Yet the distinction between technological affordance and regulatory behavior remains important: students may have access to sophisticated self-paced environments while still struggling to initiate, distribute, and sustain effective learning activity. Pan, Lai, and Guo's (2025) systematic review of technology-enhanced self-regulated second-language learning interventions reinforces this point by identifying different pedagogical roles for technology and showing that outcomes vary according to how technological support is incorporated into SRL interventions. Similarly, external technological prompts have been shown to influence engagement, self-regulation, and procrastination, suggesting that some learners benefit when autonomy is accompanied by explicit structure (Mumcu & Çebi, 2025). Thus, mobile technology may supply tools and opportunities for regulation, whereas the actual development of SRL depends on how learners engage with those opportunities and how the instructional environment structures that engagement.

2.4 Integrating Duolingo, Incentive-Based Grading, SRL, and English Achievement

Integrating incentive-based grading with Duolingo can therefore be conceptualized as combining two complementary instructional functions: the mobile application provides opportunities for learning, while the grading mechanism increases the salience of engaging with those opportunities. From an achievement perspective, additional Duolingo activity can increase opportunities to practise vocabulary, grammatical forms, reading comprehension, and other language knowledge beyond regular classroom instruction, while repeated feedback can reinforce learning during those encounters. Evidence from digital gamification in EFL indicates that carefully designed gamified learning can contribute to language achievement and motivational outcomes (Liu et al., 2024), while Duolingo-based studies similarly demonstrate the potential for supplementary app use to support language development (Fathi et al., 2024). From a behavioral perspective, grading incentives may increase the likelihood that supplementary practice receives sustained attention rather than remaining an optional resource that students engage with inconsistently (YeckehZaare & Resnick, 2025). This pathway does not imply that academic points themselves create language competence; rather, incentives may function as an engagement scaffold that encourages students to take up practice opportunities through which learning can occur. At the same time, because learners must still determine when to practise, maintain effort, respond to feedback, and monitor progress toward incentive targets, the same environment may provide opportunities to exercise aspects of self-regulation. Evidence that gamified designs can support autonomy and self-regulatory behavior (Li et al., 2024; Maimaiti & Hew, 2025) provides further justification for considering achievement and SRL as related but distinct outcomes of such an intervention.

Taken together, however, the relevant evidence remains distributed across partially separate research traditions. Duolingo and MALL studies have established the potential of mobile applications to facilitate language practice, achievement, and aspects of autonomous or self-regulated learning (Shortt et al., 2021; Li & Bonk, 2023; Fathi et al., 2024), whereas incentive research demonstrates that course structures and reward contingencies can alter students' learning behaviors (YeckehZaare & Resnick, 2025; Bai et al., 2026). Technology-enhanced SRL research, meanwhile, indicates that digital environments can support regulation but that their effectiveness depends substantially on the pedagogical role assigned to technology and the structure surrounding learner activity (Pan et al., 2025). What remains comparatively underexamined is the deliberate integration of these mechanisms within university EFL instruction—specifically, whether linking course-based academic incentives to engagement with a gamified mobile language-learning application can simultaneously support English achievement and self-regulated learning. This unresolved intersection provides the conceptual basis for examining Duolingo and incentive-based grading as an integrated instructional intervention rather than treating mobile technology, rewards, and learner regulation as independent pedagogical phenomena.

3. Method

3.1 Research Design and Context

This study employed a quantitative quasi-experimental pretest–posttest non-equivalent control group design to examine the effects of an integrated Duolingo–incentive-based grading intervention on English achievement and self-regulated learning (SRL). The design was selected because the participants belonged to pre-existing university classes, making individual random assignment impractical. Two intact classes were therefore included, with one serving as the experimental condition and the other as

the control condition. The study was conducted in the Diploma III Program in Mechanical Maintenance and Repair Engineering at Politeknik Negeri Fakfak, Indonesia, within the context of a university English course. Both outcome variables, English achievement and SRL were measured before and immediately after the three-week intervention period.

3.2 Participants

Participants were students enrolled in two intact English classes in the Diploma III Program in Mechanical Maintenance and Repair Engineering. Students in Mesin B constituted the experimental group, whereas students in Mesin A formed the control group. The final analytical sample comprised 21 students with complete data across all four measurements: English achievement pretest and posttest and SRL pretest and posttest. Eleven students were included in the experimental group and 10 in the control group. Because allocation occurred at the class level rather than through individual randomization, baseline equivalence was evaluated rather than assumed, and the primary analyses adjusted posttest outcomes for their corresponding pretest scores.

3.3 Instructional Conditions

Both groups continued regular university English instruction over the same three-week period. The experimental group additionally participated in supplementary mobile-assisted English learning through Duolingo, whereas the control group received regular instruction without Duolingo integration or the associated grading mechanism. The purpose of the supplementary Duolingo activities was to extend opportunities for English practice beyond classroom instruction while preserving students' flexibility in deciding when and how to complete the assigned learning tasks.

The distinctive feature of the experimental condition was the integration of Duolingo unit completion into the course grading system. Students in the experimental group were required to complete at least 70 Duolingo units during the intervention period. Completion of 70 units represented full completion of the supplementary learning requirement and corresponded to a Duolingo activity score of 100. Students who completed fewer than 70 units received a proportional activity score calculated as:

The activity score was capped at 100 for students completing 70 units or more. This Duolingo activity score contributed 20% to the final course grade, meaning that full completion of the required 70 units contributed a maximum of 20 points to the final course grade. The completion target, proportional scoring system, and maximum contribution to the final grade were communicated to students before the intervention began so that all students in the experimental group were subject to the same incentive structure.

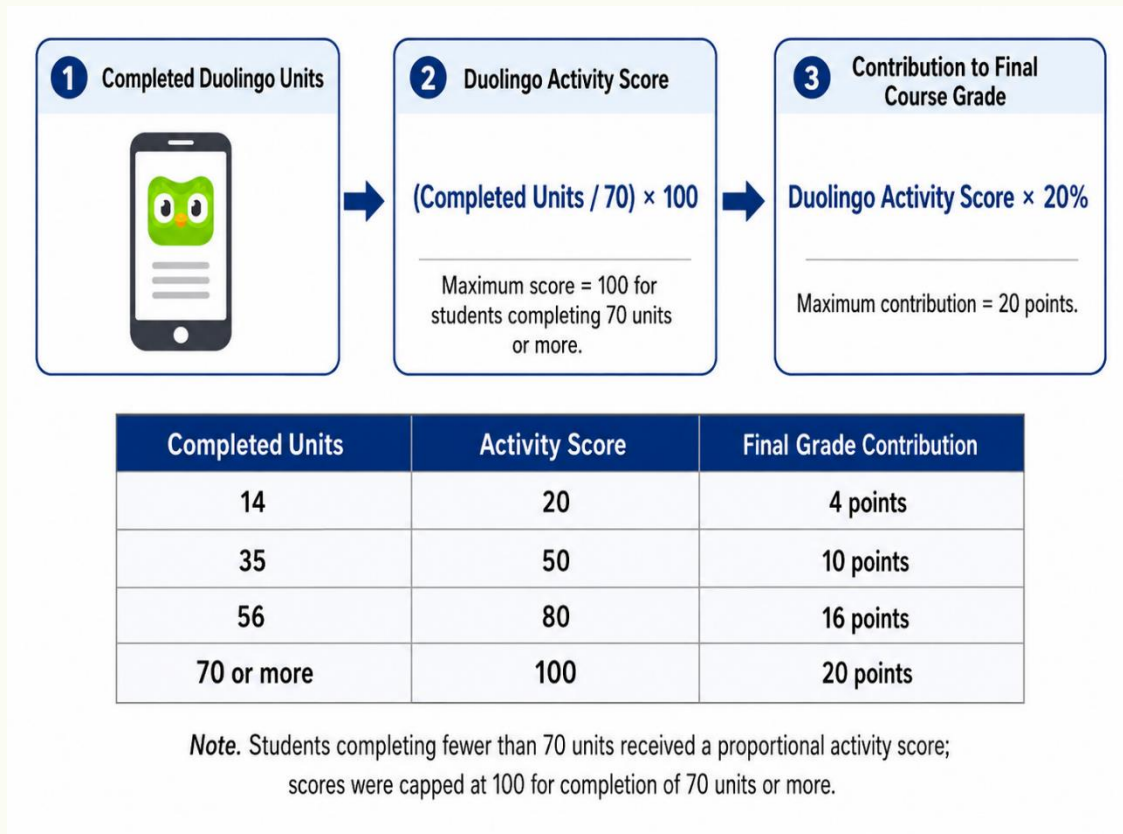


Figure 1. Duolingo Unit Completion and Incentive-Based Grading Formula

As illustrated in Figure 1, the incentive mechanism operated in three linked stages: first, students completed Duolingo units; second, completed units were converted into a proportional Duolingo activity score using the formula above; and third, the activity score was converted into a contribution to the final course grade based on the 20% weighting. For example, completion of 14 units yielded an activity score of 20 and a final-grade contribution of 4 points, whereas completion of 35 units yielded a score of 50 and a contribution of 10 points. Likewise, completion of 56 units yielded a score of 80 and a contribution of 16 points, while completion of 70 units or more yielded the maximum activity score of 100 and the maximum final-grade contribution of 20 points.

Unit completion served as an operational indicator of students' engagement with the intervention, but it was not treated as a primary dependent variable in the inferential analyses. Rather, the study focused on whether exposure to the integrated instructional package was associated with differences in English achievement and SRL. Because Duolingo-supported practice and incentive-based grading were implemented simultaneously, the intervention was treated as a single instructional package; the design was not intended to isolate the independent contribution of Duolingo and grading incentives separately. By contrast, the control group continued regular English instruction without supplementary Duolingo activities and without completion-based academic incentives. Thus, the principal instructional contrast between groups was the presence or absence of Duolingo-supported supplementary practice integrated with incentive-based grading.

3.4 Measures

a). English Achievement Test

English achievement was assessed using a 40-item researcher-developed, TOEIC-informed English achievement test. The term *TOEIC-informed* is used because the instrument drew on selected characteristics of TOEIC-style English assessment but was adapted to the participants' proficiency level, instructional context, and course learning objectives. It was not an official TOEIC examination and was not intended to generate TOEIC certification scores. The test consisted of multiple-choice items assessing English competencies relevant to the course, particularly vocabulary, grammar, and reading comprehension. Each correct response was scored 1 and each incorrect response 0, producing a raw score ranging from 0 to 40. The pretest and posttest were designed around comparable construct coverage and levels of difficulty so that changes in English achievement over the intervention period could be meaningfully evaluated. Scores are therefore reported throughout the study as English Achievement scores rather than TOEIC scores.

b). Self-Regulated Learning Questionnaire

SRL was measured using a 40-item adaptation of the *EFL Self-Regulated Learning Questionnaire* developed by Salehi and Jafari (2015). The original instrument consisted of 41 items representing 13 dimensions of self-regulated language learning, namely intrinsic motivation, self-efficacy, locus of control orientation, attitude, organization, memory strategies, self-monitoring, self-evaluation, planning and goal setting, concentration and sustained attention, effort regulation, regulation of the learning environment, and help seeking. For the present study, the instrument was contextually adapted for university English learners and administered using a five-point Likert scale. Negatively worded items were reverse-scored before computing the overall SRL score so that all items were oriented in the same direction. The overall SRL score was calculated as the mean across the included items, yielding a theoretical range from 1 to 5, with higher scores indicating stronger SRL. The adapted questionnaire demonstrated good internal consistency at pretest, Cronbach's α .95% CI [.809, .964], and at posttest, α .95% CI [.850, .948].

c). Data Collection Procedure

Data collection proceeded through three phases. Before the intervention began, both groups completed the English achievement pretest and the SRL questionnaire. These measurements established baseline levels of English achievement and SRL and later served as covariates in the primary between-group analyses. During Weeks 1–3, students in the experimental group continued regular instruction while simultaneously completing supplementary Duolingo activities under the incentive-based grading arrangement described above. The control group continued regular English instruction during the same period without Duolingo integration or academic incentives linked to mobile learning. Immediately after the completion of the three-week intervention, participants in both groups completed the English achievement posttest and the SRL questionnaire for the second time. This sequence enabled examination of within-group change as well as baseline-adjusted between-group differences.

d). Statistical Analysis

Statistical analyses were conducted in JASP using two-tailed tests with α . Descriptive statistics were calculated for both outcomes by group and measurement occasion. Internal consistency of the adapted SRL questionnaire was evaluated using Cronbach's α with 95% confidence intervals. Baseline differences between groups were examined using independent-samples t -tests accompanied by Cohen's d . Because

the groups were not randomized, these comparisons were interpreted as diagnostic descriptions of baseline imbalance rather than as evidence of successful or unsuccessful randomization.

The primary inferential analyses consisted of two ANCOVA models. For English achievement, posttest achievement served as the dependent variable, instructional group as the fixed factor, and pretest English achievement as the covariate. For SRL, posttest SRL served as the dependent variable, instructional group as the fixed factor, and pretest SRL as the covariate. ANCOVA was prioritized because it provides a baseline-adjusted comparison of post-intervention outcomes and is especially appropriate for a non-equivalent-groups design in which pre-existing differences cannot be assumed absent. Homogeneity of regression slopes was examined by testing the interaction between group and the corresponding pretest score. Residual variance homogeneity was assessed using Levene's test, and residual distributions were evaluated through visual inspection of Q–Q plots. Results were reported using statistics, $-$ -values, partial eta squared (η^2), and adjusted marginal means with 95% confidence intervals.

Several supplementary analyses were conducted to characterize change patterns and complement the ANCOVA findings. Within-group pretest–posttest change was examined using paired-samples t -tests, with mean differences, 95% confidence intervals, and Cohen's d reported. Gain scores were calculated as posttest minus pretest and compared between groups using independent-samples t -tests accompanied by Cohen's d and 95% confidence intervals. Before gain-score comparisons, Shapiro–Wilk tests and Brown–Forsythe tests were used to examine distributional and variance assumptions. Given the small analytical sample, interpretation emphasized the direction and magnitude of effects and their confidence intervals in addition to conventional statistical significance.

e). Ethical Considerations

The study was conducted with attention to informed participation, confidentiality, anonymity, and responsible use of students' academic data. Students were informed about the study and the use of their learning data before data collection, and personally identifying information was excluded from the analytical dataset and research reporting.

4. Results

4.1 Preliminary Analyses

The final analytical sample comprised 21 students with complete data across all outcome measurements, including 11 students in the experimental group and 10 in the control group. No missing values were present in the final dataset. The adapted Self-Regulated Learning (SRL) questionnaire demonstrated good internal consistency at both measurement occasions, with Cronbach's ($\alpha = .887$), 95% CI [.809, .964], at pretest and ($\alpha = .899$), 95% CI [.850, .948], at posttest.

Table 1 presents the descriptive statistics and baseline comparisons for English achievement and SRL across the experimental and control groups. For English achievement, the experimental group had a pretest mean of 26.18 ($SD = 9.66$), compared with 23.60 ($SD = 10.55$) in the control group. No statistically detectable baseline difference was observed, ($t(19) = 0.585$), ($p = .565$), Cohen's ($d = .256$). In contrast, baseline SRL differed substantially between groups. The experimental group reported a lower initial SRL score ($M = 3.286$, $SD = 0.331$) than the control group ($M = 3.598$, $SD = 0.328$), ($t(19) = -2.159$), ($p = .044$), ($d = -.944$). Given this initial imbalance,

baseline-adjusted analysis was particularly important for interpreting the comparative SRL outcome.

Table 1. Descriptive statistics and baseline comparisons

Outcome	Group	n	Pretest M (SD)	Posttest M (SD)	Mean change	Baseline (t)	(p)	Cohen's (d)
English achievement	Experi mental	11	26.18 (9.66)	35.00 (7.27)	+8.82	0.585	.565	.256
	Control	10	23.60 (10.55)	28.40 (8.75)	+4.80			
SRL	Experi mental	11	3.286 (0.331)	3.441 (0.311)	+0.155	-2.159	.044	-.944
	Control	10	3.598 (0.328)	3.600 (0.355)	+0.003			

Assumption checks provided no substantial evidence against the planned parametric analyses. Shapiro–Wilk tests indicated no marked departures from normality for English or SRL gain scores in either group (all ($p \geq .474$)), while Brown–Forsythe tests supported homogeneity of gain-score variances for English achievement ($(p = .437)$) and SRL ($(p = .257)$). For the ANCOVA models, the group $\times$ pretest interactions were non-significant for English achievement ($(p = .319)$) and SRL ($(p = .721)$), supporting the homogeneity-of-regression-slopes assumption. Levene’s tests likewise provided no evidence of unequal residual variances for English achievement ($(p = .529)$) or SRL ($(p = .057)$).

4.2 Effects on English Achievement

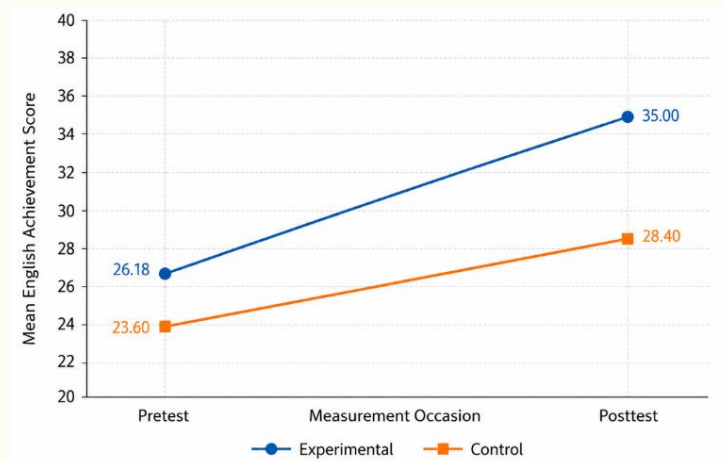


Figure 2. Changes in English achievement from pretest to posttest by instructional condition

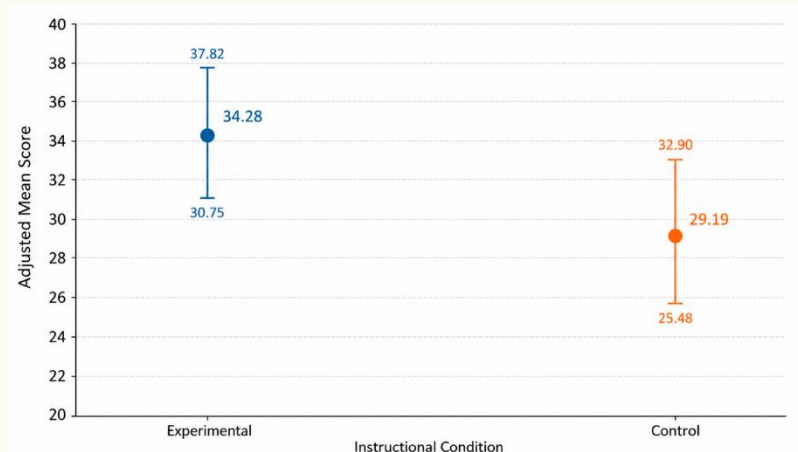
Note. Values represent mean English achievement scores for the experimental and control groups at each measurement occasion.

English achievement increased in both groups over the three-week study period, although the descriptive increase was larger in the experimental condition. As shown in Figure 2, the experimental group increased from ($M = 26.18$) ($(SD = 9.66)$) at pretest to ($M = 35.00$) ($(SD = 7.27)$) at posttest, representing a mean increase of 8.82 points. This within-group change was statistically significant, ($t(10) = 3.709$), ($p = .004$), 95% CI [3.521, 14.11], with a large standardized effect, ($d = 1.118$). The control group also improved significantly, from ($M = 23.60$) ($(SD = 10.55)$) to ($M = 28.40$) ($(SD = 8.75)$), corresponding to a mean increase of 4.80 points, ($t(9) = 2.773$), ($p = .022$), 95% CI [0.885, 8.715], ($d = .877$). The within-group changes and corresponding effect sizes for both outcomes are summarized in Table 2.

Table 2. Pretest–posttest changes and between-group gain comparisons

Outcome	Group	Mean change	Paired (t) (df)	(p)	95% CI of change	Within-group (d)	Between-group gain (d)	(p)
English achievement	Experimental	8.818	3.709 (10)	.004	[3.521, 14.11]	1.118	.587	.195
	Control	4.800	2.773 (9)	.022	[0.885, 8.715]	.877		
SRL	Experimental	0.155	2.424 (10)	.036	[0.012, 0.297]	.731	.565	.211
	Control	0.003	0.025 (9)	.981	[-0.227, 0.232]	.008		

The experimental group therefore gained approximately 4.02 points more than the control group. However, as further reported in Table 2, the between-group gain-score comparison was not statistically significant, ($t(19) = 1.343$), ($p = .195$). The standardized difference favored the experimental group and was moderate in magnitude, ($d = .587$), but the 95% confidence interval was wide and crossed zero, 95% CI [-.297, 1.456]. Thus, the gain-score analysis indicated a directional advantage for the experimental condition but did not provide statistically conclusive evidence of a between-group difference.

**Figure 3.** Adjusted posttest English achievement means by instructional condition

Note. Estimated marginal means were adjusted for pretest English achievement. Error bars represent 95% confidence intervals.

The primary analysis compared posttest English achievement after adjusting for pretest performance. The estimated marginal mean was 34.28 (95% CI [30.75, 37.82]) for the experimental group and 29.19 (95% CI [25.48, 32.90]) for the control group, corresponding to an adjusted difference of approximately 5.09 points in favor of the experimental condition. As illustrated in Figure 3, the experimental group retained a higher adjusted posttest mean after baseline achievement was controlled. The adjusted group effect did not reach the prespecified significance threshold, ($F(1,18) = 4.318$), ($p = .052$), although the estimated effect was relatively large, partial ($\eta_p^2 = .193$). Pretest English achievement was strongly associated with posttest performance, ($F(1,18) = 21.37$), ($p < .001$), partial ($\eta_p^2 = .543$).

Overall, the experimental condition showed a consistent directional advantage in English achievement across the descriptive, gain-score, and baseline-adjusted analyses; however, the primary ANCOVA did not provide statistically conclusive evidence of a group effect.

4.3 Effects on Self-Regulated Learning

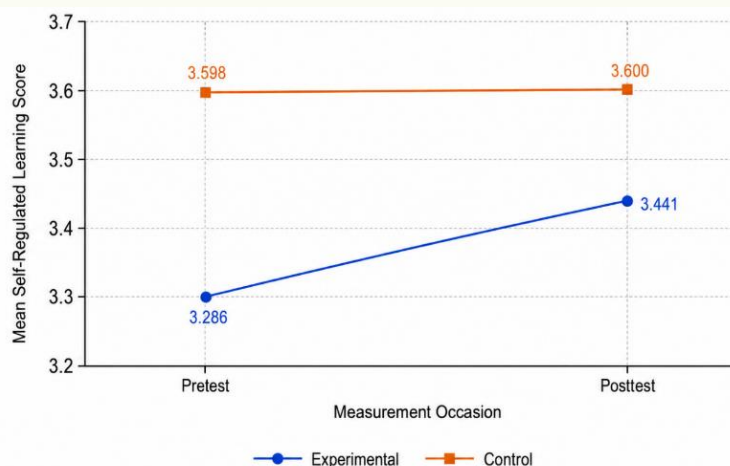


Figure 4. Changes in self-regulated learning from pretest to posttest by instructional condition.

Note. Values represent mean SRL scores for the experimental and control groups at each measurement occasion.

A different pattern emerged for SRL. As shown in **Figure 4**, the experimental group increased from ($M = 3.286$) ($SD = 0.331$) at pretest to ($M = 3.441$) ($SD = 0.311$) at posttest, corresponding to a mean increase of 0.155 points. This within-group change was statistically significant, ($t(10) = 2.424$), ($p = .036$), 95% CI [0.012, 0.297], with ($d = .731$). In contrast, the control group's SRL remained essentially unchanged, increasing from ($M = 3.598$) ($SD = 0.328$) to ($M = 3.600$) ($SD = 0.355$). The mean change of 0.003 points was not statistically significant, ($t(9) = 0.025$), ($p = .981$), 95% CI [-0.227, 0.232], with an effect size close to zero, ($d = .008$).

Despite these contrasting within-group patterns, the between-group difference in SRL gains was not statistically significant. The experimental group had a mean gain of 0.155 ($SD = 0.211$), compared with 0.003 ($SD = 0.321$) in the control group. The 0.152-point difference yielded ($t(19) = 1.294$), ($p = .211$), with a moderate standardized effect, ($d = .565$), 95% CI [-.316, 1.433]. The wide confidence interval indicated substantial uncertainty around the magnitude of the difference.

Table 3. ANCOVA results for English achievement and self-regulated learning

Outcome	Effect	(F) (df)	(p)	Partial (η_p^2)	Experimental adjusted M (95% CI)	Control adjusted M (95% CI)
English achievement	Group	4.318 (1, 18)	.052	.193	34.28 [30.75, 37.82]	29.19 [25.48, 32.90]
	Pretest covariate	21.37 (1, 18)	<.001	.543	—	—
SRL	Group	0.171 (1, 18)	.684	.009	3.541 [3.371, 3.711]	3.490 [3.311, 3.669]
	Pretest covariate	14.68 (1, 18)	.001	.449	—	—

Given the substantial baseline difference in SRL, the ANCOVA constituted the primary basis for interpreting the comparative intervention effect. As reported in Table 3, the estimated marginal mean after adjustment for pretest SRL, the estimated marginal mean was 3.541 (95% CI [3.371, 3.711]) for the experimental group and 3.490 (95% CI [3.311, 3.669]) for the control group, producing an adjusted difference of only 0.051 points. As illustrated in Figure 5, the adjusted means were therefore very similar across the two instructional conditions. The group effect was not statistically significant, ($F(1,18) = 0.171$), ($p = .684$), with a very small effect, partial ($\eta_p^2 = .009$). By contrast, baseline SRL was strongly associated with posttest SRL, ($F(1,18) = 14.68$), ($p = .001$), partial ($\eta_p^2 = .449$).

Although SRL increased significantly within the experimental group and remained virtually unchanged in the control group, this pattern did not translate into a meaningful baseline-adjusted between-group difference. The primary ANCOVA therefore provided little evidence of a comparative SRL advantage for the integrated intervention over the three-week study period.

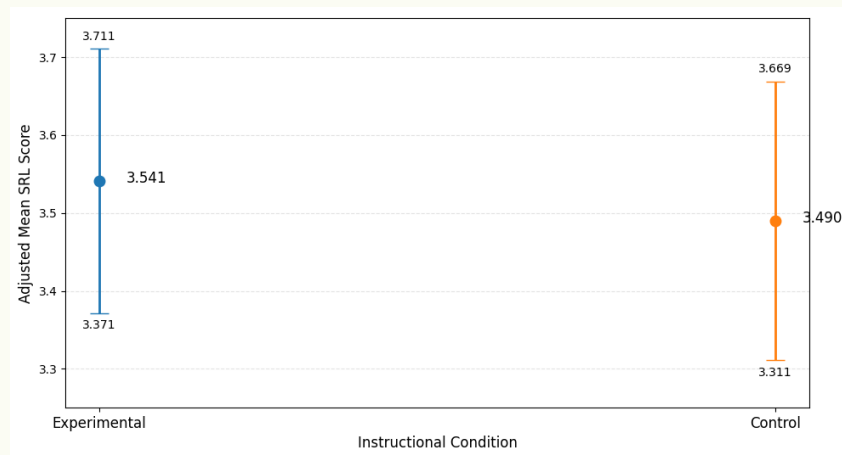


Figure 5. Adjusted posttest self-regulated learning means by instructional condition.

Note. Estimated marginal means were adjusted for pretest SRL. Error bars represent 95% confidence intervals.

5. Discussion

5.1 The Implementation of PjBL in Teaching Narrative Writing

The implementation followed a structured seven-stage model adapted from Friska (2018), consisting of project initiation, planning, drafting, revision, presentation, reflection, and value integration. These stages were not only directed at improving students' writing abilities but were also intentionally aligned with the school's Islamic character-building mission. The findings suggest that PBL offered a flexible yet purposeful framework that supported both language skill development and the cultivation of moral values. Prior related studies indicate that PBL enhances student engagement, motivation, and language proficiency in various contexts, including Mandarin and English as a Second Language (ESL) instruction (Joseph & Añazco, 2025).

This study explored the stage leaning of Friska (2018). One key aspect in the initial stage of the PBL implementation was the use of rich visual prompts, including colorful illustrations and symbolic imagery, to initiate the narrative writing process. These multimodal resources served not only as creative stimuli but also as scaffolding tools that

guided students in generating original ideas. Additionally, Vygotsky's (1978) sociocultural theory emphasizes the role of mediated tools in supporting learners' cognitive development. In this context, visuals did not merely capture attention; they activated students' prior knowledge and imagination, enabling them to develop meaningful narratives.

During the second phase, students engaged in collaborative planning. Group discussions were observed to be rich in negotiation and critical dialogue, particularly as students built the structure of their stories, including orientation, complication, and resolution. This stage exemplifies the impact of collaboration in PBL; it has been shown to improve critical thinking skills and language competencies such as vocabulary acquisition, speaking, writing, and reading comprehension in EFL learners (Song et al., 2024). This collaboration also leads to and increases the students' initiative and reflects growing their role as active content creators (Lyu, 2023)

The third phase involved drafting narratives and visual design. Students translated their ideas into English, structured their plots, and developed visual elements like cover pages. This stage clearly demonstrated students' evolving awareness that writing is not only a language task but also a tool for moral expression. Students demonstrated autonomy and responsibility, as they delegated roles, cross-checked content, and integrated Islamic values organically into their texts. Furthermore, PjBL boosted participation, time management, and interaction among middle school students (Isnaini et al., 2024). The study of Hendrawati et al (2024) also claimed that PBL could lead to dynamic interaction and mutual assistance skills for the elementary level. It could be concluded that this approach was well-applied at various levels. Teachers should guide and actively support this activity by providing feedback on both linguistic and moral aspects.

In the fourth stage, students conducted informal research and engaged in peer review to refine their stories. The emphasis was on ensuring that the content conveyed clear moral lessons and aligned with Islamic values. Teachers guided reflection sessions to help students identify areas for improvement, both in content and language. This phase emphasized emotional and reflective growth, as students revisited their ideas, evaluated their clarity, and adjusted their language use. The integration of grammar instruction within moral discussion also reinforced the holistic nature of this approach. Teachers reported that students began to question not only the accuracy of their sentences but also the meaningfulness of their messages.

The fifth stage of PBL was showing a mini-exhibition where students presented their storybooks. Based on the prior related studies, this stage has been shown to significantly foster students' speaking skills, self-confidence, and learning achievement (Gamarra-Pautt & Giraldo-Martinez, 2025). The presentation consisted of a synopsis, visual display, and moral reflection. Assessment rubrics also involved language accuracy, originality, collaboration, and Islamic integration. This public sharing allowed students to perform as authors and presenters, reinforcing their confidence and sense of achievement (Manda & Arifin, 2024). It also reinforced the social aspect of learning, as students received peer and teacher feedback in a supportive environment.

The sixth phase involved structured reflection. Through group discussions, students identified challenges, celebrated successes, and evaluated group dynamics. Teachers also reflected on instructional strategies and student outcomes during follow-up interviews. These current findings also showed improvements in social skills, such as creativity, grammar awareness, and teamwork (Manda & Arifin, 2024). Teachers noted that the reflection stage helped consolidate learning and provided valuable insights for improving future instructional design.

A distinctive feature of this PBL implementation was its alignment with Islamic values. Students were encouraged to embed Qur'anic principles such as honesty, perseverance, and kindness within their narratives. This integration was not superficial but embedded meaningfully into plotlines and character development. This incorporation ensured that the project did not merely achieve academic goals but also fulfilled the school's vision of shaping students with both global competence and spiritual depth. Prior researchers also believed that PBL could boost Islamic values in educational settings (Afifah & Yuliyanti, 2024).

5.2 The Students' Perceptions of Using Narrative Projects in Developing Creative Writing Skills

The findings of this study revealed that students perceived narrative projects within the Project-Based Learning (PBL) framework as a meaningful and engaging way to enhance their creative writing skills. This perception aligns with earlier studies that PBL significantly improves students' writing abilities by promoting active engagement, critical thinking, and creativity through real-world, student-centered tasks (Abrudan, 2025; Chao et al., 2025).

First, students highlighted that the narrative project provided them with greater freedom of expression. The opportunity to choose their own topics, characters, and plots gave learners a sense of ownership, shifting their role from passive recipients of textbook-based writing to active authors of original narratives (Sultan et al., 2023). This finding supports research by Beckett and Slater (2020), who argue that autonomy in project work stimulates students' intrinsic motivation and fosters creativity. The students' reflections in this study indicate that when given a choice, they were more invested in the writing process and developed a stronger sense of identity as writers.

Second, the use of visual prompts and multimodal resources was perceived as highly supportive in generating ideas. Students noted that colorful illustrations sparked imagination and helped them conceptualize the setting and characters for their stories. This confirms the argument of Mayer's (2009) multimodal learning theory, which suggests that visual stimuli enhance comprehension and creativity. The role of visual scaffolding in this study not only lowered students' anxiety at the beginning of the task but also made narrative writing more approachable and enjoyable.

Third, collaboration emerged as a central theme in students' perceptions. Group work encouraged peer negotiation, idea sharing, and co-construction of narratives. Such collaborative dynamics reduced individual writing anxiety and enabled students to pool their linguistic and creative resources. These findings from Lyu (2023) and Song et al. (2024), suggest that collaborative PBL environments enhance both social interaction and language development. In this study, students reported that joint brainstorming and task distribution strengthened their sense of community and made the process of writing more dynamic and supportive (Choustoulakis et al., 2025).

Fourth, students valued the integration of Islamic values into their narratives. Embedding moral lessons such as honesty, patience, and kindness made the stories personally and spiritually meaningful. The incorporation of religious values gave students a sense of pride and relevance, as they could connect language learning with their daily lives and faith. This aspect distinguishes the present study from previous PBL research in secular contexts, highlighting the adaptability of PBL in Islamic educational settings. It also resonates with Afifah and Yuliyanti (2024), who argued that project-based tasks can be effectively contextualized to reinforce moral and cultural education.

Finally, the presentation stage of the project contributed to students' sense of accomplishment. Although students initially felt nervous, they later expressed pride in

sharing their creations with peers and teachers. This aligns with prior research by Gamarra-Pautt and Giraldo-Martinez (2025), who found that public presentation of project outcomes builds students' confidence and communicative competence. In this study, the presentation phase served as a powerful motivator, allowing students to experience authentic authorship and receive recognition for their work.

Taken together, these perceptions demonstrate that narrative projects fostered not only linguistic development but also creativity, collaboration, moral reflection, and self-confidence. The findings therefore support the view that PBL is not simply a pedagogical strategy for language learning but also a holistic framework for developing learners' cognitive, affective, and social dimensions. In the context of a modern Islamic boarding school, the integration of faith-based values further enhanced the meaningfulness of the project and ensured its alignment with institutional educational goals.

6. Conclusion

The implementation of Project-Based Learning (PBL) in teaching narrative writing, through a structured seven-stage model adapted from Friska (2018), successfully fostered both linguistic and moral development. Students not only improved their creative writing skills but also embedded Islamic values such as honesty, perseverance, and kindness into their stories. The findings revealed that PBL supported autonomy, collaboration, critical thinking, and confidence, while simultaneously aligning with the institution's mission of character building. Students' positive perceptions confirmed that narrative projects made writing more meaningful, enjoyable, and personally relevant.

These results imply that PBL can serve as a holistic pedagogical model in EFL contexts, particularly in Islamic education. By integrating visual scaffolds, collaborative planning, multimodal outputs, and value-based reflection, teachers can design language lessons that go beyond grammar and vocabulary, nurturing students' cognitive, affective, and moral capacities. The study also highlights the adaptability of PBL in religious schooling, showing its potential to harmonize global competence with local values. Future educators may consider using narrative projects as a strategy to cultivate creativity and intercultural awareness while reinforcing institutional missions.

Despite its promising outcomes, this study has several limitations. First, it was conducted in a single Islamic boarding school, which may limit the generalizability of the findings to other educational contexts. Second, the research relied primarily on qualitative data, such as classroom observation and student reflections, without measuring language gains quantitatively. Third, the implementation covered only one semester, leaving questions about the long-term sustainability of PBL's effects. Future research should include larger samples, mixed-method approaches, and longitudinal designs to provide deeper insights into the impact of PBL on narrative writing and value integration.

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