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Dose-Dependent Association Between Pancasila Student Profile (P5) Curriculum Exposure and Civic Engagement Among Indonesian Secondary School Students

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ABSTRACT

Background. The Projek Penguatan Profil Pelajar Pancasila (P5; Pancasila Student Profile Strengthening Project) is a defining component of Indonesia's Kurikulum Merdeka, introduced in 2022. It aims to build civic values and participatory dispositions through project-based learning, yet large-scale quantitative evidence on its link to civic engagement is scarce.

Objective. This study evaluated the association between P5 exposure intensity and civic engagement among Indonesian secondary school adolescents, controlling for established sociodemographic confounders.

Methods. This cross-sectional study drew a stratified cluster sample of 312 students (Grades 10–12) from 18 secondary schools in five provinces. Civic engagement was measured with a 25-item instrument adapted from the International Association for the Evaluation of Educational Achievement (IEA) framework (Cronbach's $\alpha = 0.83$; composite 0–100; high engagement ≥ 65). School-level participation scores classified P5 exposure as high, moderate, or low. Multivariable logistic regression identified independent predictors of high engagement.

Results. Scores rose across exposure groups (low 49.1, moderate 61.0, high 72.3; ANOVA $F(2,309) = 86.85$, $p < 0.001$; $\eta^2 = 0.36$; Cohen's $d = 2.04$ for high vs low). High P5 exposure was independently associated with higher odds of high civic engagement (adjusted OR = 17.12; 95% CI 3.82–76.74; $p < 0.001$), as was each unit of continuous participation (OR = 2.44; 95% CI 1.71–3.48; $p < 0.001$). Model fit was good (AUC = 0.82).

Conclusion. In this cross-sectional sample, higher P5 exposure was associated with stronger civic engagement in a graded pattern. The findings support longitudinal study of high-fidelity, equitable implementation of the Merdeka Curriculum.

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1. Introduction

Civic education has a foundational role in democratic nation-building, especially for adolescents, who will form the future electorate and act as primary participants in civil society. Indonesia is one of the world's largest democracies. Raising active, informed, and participatory young citizens there has become more urgent as political decentralization moves fast, digital disinformation spreads, and youth political trust and efficacy cause worry.[1–3] Civic education in Indonesia has traditionally been delivered through the Pendidikan Pancasila dan Kewarganegaraan (PPKn) subject. That subject has drawn sustained criticism for being didactic, teacher-centered, and exam-oriented. Reviews describe a persistent gap between its stated aim of forming character and the participatory competencies students actually show.[4]

Two traditions of civic-education scholarship ground this study. The first is Westheimer and Kahne's typology, which separates 'personally responsible,' 'participatory,' and 'justice-oriented' citizenship. It supplies a normative frame in which the focus of the Projek Penguatan Profil Pelajar Pancasila (P5; Pancasila Student Profile Strengthening Project) on community action and democratic deliberation fits participatory and justice-oriented citizenship formation.[5] The second is Lave and Wenger's situated-learning theory. It holds that lasting civic competence grows through legitimate peripheral participation in authentic community settings, which is the pedagogical principle that P5's community-embedded projects put into practice.[6,7] Meta-analyses of project-based learning point the same way. They report medium-to-large effects on cognitive and affective outcomes, including in Indonesian schools.[8–10] Figure 1 summarizes the hypothesized relationships among these constructs.

The *Kurikulum Merdeka*, introduced in 2022, moved Indonesia from a standardized, content-heavy model to a flexible, competency-based, student-centered one.[11] Its defining feature is the P5 project, which sets aside dedicated time for interdisciplinary learning around six character dimensions. The Suara Demokrasi (Voice of Democracy) theme targets civic competencies most directly. The evidence so far is mostly qualitative and small in scale. Implementation studies describe stronger deliberation and student-election participation. They cannot establish how large the P5–civic engagement association is, they do not document dose-response patterns, and they do not adjust for sociodemographic confounders known to predict adolescent civic outcomes: gender, geographic context, parental education, and extracurricular participation.[12–15]

Few studies have looked at graded P5 exposure and validated civic engagement among Indonesian secondary students at scale. None has modeled categorical dose-response and continuous participation predictors together while controlling for established covariates in a multivariable regression. To our knowledge, this study examines the relationship across several provinces, school types, and geographic contexts, using an internationally informed, locally validated instrument and a full set of effect-size estimates. The purpose was twofold. We evaluated the association between P5 curriculum exposure and high civic engagement, and we identified the independent predictors of high civic engagement among Indonesian secondary school adolescents after covariate adjustment.

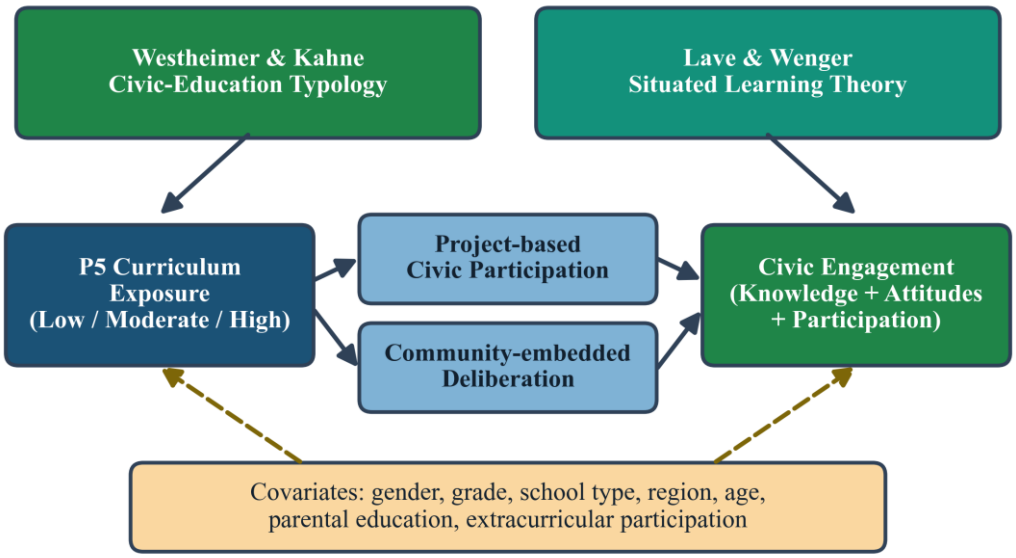


Figure 1. Theoretical framework linking P5 curriculum exposure to civic engagement through project-based participation and community-embedded deliberation, with sociodemographic covariates.

2. Methods

2.1 Study design and setting

This study used a cross-sectional survey design and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational research.[16] Data were collected between March and June 2024 from secondary schools in five Indonesian provinces. The provinces were chosen to represent geographic and sociodemographic diversity across the Java, Sulawesi, and Sumatra regions. To protect confidentiality, participating institutions are described by sector and setting and not named. Schools came from provincial-capital (urban) and district-level (rural or semi-urban) areas. All had formally adopted the Merdeka Curriculum and had completed at least one full academic year of P5 implementation before data collection.

2.2 Participants and sampling

The target population was all students in Grades 10–12 (senior high school, SMA, and vocational high school, SMK) in Merdeka Curriculum-implementing schools of the study provinces. Cluster sampling was stratified. Schools were grouped at the same time by sector (public/private), geographic setting (urban/rural), and preliminary P5 implementation intensity, which was assessed from administrator reports with a five-item fidelity checklist during site visits. Within each stratum, schools were drawn by systematic random sampling from provincial education-office registries. Eighteen schools took part. In each, 2–3 classrooms were chosen by simple random sampling, and every eligible student in those classrooms was invited. To be included, students had to be enrolled in Grades 10–12, to have taken part in at least one complete P5 project cycle, and to give written assent (with parental consent for participants under 18). Of 348 students approached, 36 were excluded (12 incomplete responses, 14 with insufficient P5 exposure, 10 who declined). The final analytic sample was 312.

2.3 Outcome measurement: civic engagement

Civic engagement was measured with a 25-item instrument adapted from the International Association for the Evaluation of Educational Achievement (IEA) International Civic and Citizenship Education Study framework.[17,18] The instrument has three parts: civic knowledge (10 multiple-choice items, 30 points), civic attitudes (8 five-point Likert items on democratic values, rule of law, and tolerance), and civic participatory behaviors (7 items on reported and intended civic actions). This tripartite structure matches established civic-engagement measurement.[19] Two independent bilingual researchers translated the items into Bahasa Indonesia, and three PPKn experts reviewed them for content validity. A pilot sample (n = 60) from two non-study schools was used for validation. Exploratory factor analysis confirmed a three-factor structure (61.4% of variance), and confirmatory factor analysis gave acceptable fit (comparative fit index, CFI = 0.94; Tucker–Lewis index, TLI = 0.93; root mean square error of approximation, RMSEA = 0.058; standardized root mean square residual, SRMR = 0.061). In the pilot, reliability was satisfactory for the full scale (Cronbach's α = 0.84) and acceptable for each sub-scale (knowledge 0.79; attitudes 0.77; participation 0.72). Metric invariance held across gender and school type (change in CFI, ΔCFI < 0.010). The three sub-dimensions were standardized and weighted equally to form a composite score (0–100). Students scoring ≥ 65 were classified as showing high civic engagement, and sensitivity analyses used cut-points of 60 and 70.

Content validity at scale level was quantified after review by three independent PPKn specialists with no affiliation to the data-collection sites (scale-level content-validity index, S-CVI/Ave = 0.93). Four items were revised and two were replaced after the pilot. Reliability is given as Cronbach's alpha, with McDonald's omega added for the multidimensional composite (full-scale ω = 0.86). For the dichotomously scored civic-knowledge sub-scale, the Kuder–Richardson 20 coefficient (KR-20 = 0.78) is reported instead of alpha. Reliability was estimated again in the full analytic sample (full-scale alpha = 0.83; 95% CI

0.80–0.86), and it matched the pilot, which is the value reported in the Abstract.

2.4 P5 exposure and participation

P5 curriculum exposure was defined at the school level with a 15-item self-report P5 Participation Scale (range 1–5; α = 0.81), which measures the frequency, depth, and perceived quality of project engagement. School-level mean scores sorted schools into high (≥ 4.0), moderate (3.0–3.99), or low (< 3.0) exposure. The continuous student-level participation score was kept as an independent predictor to capture variation within schools. The intraclass correlation coefficient (ICC) for participation within schools was 0.08, which indicates modest clustering. A multilevel logistic model with random school intercepts was therefore fitted next to the primary model, and the two sets of results were compared for agreement.

2.5 Covariates

Covariates were specified in advance and chosen from the civic-socialization literature: gender (female/male), grade level (10/11/12), school type (public/private), geographic region (urban/rural), age (years), parental educational attainment (primary/secondary/tertiary), and extracurricular participation in any organized school activity (yes/no).[14,15,20]

2.6 Statistical analysis

Descriptive statistics are given as frequencies and percentages or as means ± standard deviations. The Shapiro–Wilk test ($W = 0.997$, $p = 0.845$) showed normality, which justified parametric methods. Pearson's correlation described the bivariate relationship between continuous P5 participation and civic-engagement scores. Differences across P5 exposure groups were tested with one-way analysis of variance (ANOVA) and Bonferroni post-hoc comparisons, and reported with η^2 and Cohen's d effect sizes. Categorical associations were tested with chi-square and Cramér's V (Fisher's exact test where expected counts were < 5). The multivariable binary logistic regression had high civic engagement (≥ 65 vs < 65) as the dependent variable and included all covariates. It reports odds ratios (ORs) with 95% confidence intervals (CIs) and exact two-tailed p-values. Model fit was assessed with the Hosmer–Lemeshow test, Nagelkerke R^2, and the area under the receiver operating characteristic (ROC) curve (AUC). Variance inflation factors (VIFs) were below 2.5 for all predictors. The significance threshold was $p < 0.05$ (two-tailed). Analyses were run in Python 3.11.

Hypotheses were ordered in advance. The association between P5 exposure and high civic engagement was the single confirmatory hypothesis. All covariate and sub-scale associations were secondary or exploratory, and they are interpreted with matching caution. Observations were clustered within schools (ICC = 0.08; mean cluster size 17.3; design effect 2.31; effective sample size ≈ 135). A multilevel binary logistic model with random school intercepts was therefore the primary inferential model, and cluster-robust standard errors were applied to bivariate comparisons. Levene's test assessed homogeneity of variance. Skewness and kurtosis were examined along with the Shapiro–Wilk test to judge distributional shape. The Box–Tidwell procedure checked linearity in the logit for continuous predictors. The low-exposure, high-engagement cell was sparse, so the high-versus-low contrast was estimated again with Firth penalized-likelihood logistic regression. A hybrid (Mundlak) specification split the continuous participation predictor into within-school and between-school components. Adjusted predicted probabilities of high civic engagement were computed at each exposure level, and 95% confidence intervals were attached to all effect sizes. Effect sizes were read against conventional thresholds (Cohen's d: 0.2 small, 0.5 medium, 0.8 large; η^2: 0.01, 0.06, 0.14).

2.7 Ethical considerations

The Ethics Committee of Social Research, Enigma Institute, Indonesia, granted ethical approval for this study (Approval No. 2024/087), and the study followed the Declaration of Helsinki. All participants aged 18 years and above gave written informed consent. For participants below 18 years, written parental or guardian consent and student assent were obtained. Participation was voluntary, with no penalty for non-participation or withdrawal. All data were anonymized before analysis and stored on password-protected institutional servers.

3. Results

Among the 312 students in the final analysis, the mean civic-engagement score was 63.43 ± 13.24 (range 27.5–98.0). A total of 155 students (49.7%) reached the high civic-engagement threshold (≥ 65). The mean P5 participation score was 3.52 ± 0.84. P5 participation and civic-engagement scores correlated strongly and positively (Pearson $r = 0.62$; $r^2 = 0.38$; $p < 0.001$). Table 1 gives the baseline characteristics. The sample was balanced by region (urban 49.4%, rural 50.6%) and mostly attended public schools (65.7%). Mean age was 16.27 ± 1.05 years.

Table 1. Baseline characteristics of study participants (n = 312).

Variable	n (%)	Mean ± SD
Gender — Female	172 (55.1%)	—
Gender — Male	140 (44.9%)	—
Grade 10	104 (33.3%)	—
Grade 11	111 (35.6%)	—
Grade 12	97 (31.1%)	—
School type — Public	205 (65.7%)	—
School type — Private	107 (34.3%)	—
Region — Urban	154 (49.4%)	—
Region — Rural	158 (50.6%)	—
P5 exposure — High	114 (36.5%)	—
P5 exposure — Moderate	131 (42.0%)	—
P5 exposure — Low	67 (21.5%)	—
Parental education — Tertiary	119 (38.1%)	—
Parental education — Secondary	135 (43.3%)	—
Parental education — Primary	58 (18.6%)	—
Extracurricular — Yes	194 (62.2%)	—
Extracurricular — No	118 (37.8%)	—
Age (years)	—	16.27 ± 1.05
P5 participation score (1–5)	—	3.52 ± 0.84
Civic-engagement score (0–100)	—	63.43 ± 13.24
Civic-knowledge score (0–30)	—	19.01 ± 4.41

Note: Values are n (%) for categorical variables and mean ± SD for continuous variables.

Bivariate analyses showed strong associations between P5 exposure and civic engagement (Table 2). Mean civic-engagement scores rose steadily across exposure groups (low 49.1 ± 10.2; moderate 61.0 ± 11.8; high 72.3 ± 12.1; ANOVA $F(2,309) = 86.85$, $p < 0.001$; $\eta^2 = 0.36$, a large effect). All Bonferroni-corrected pairwise comparisons were significant at $p < 0.001$ (Cohen's $d = 2.04$ for high vs low, 1.05 for moderate vs low, and 0.95 for high vs moderate). The proportion with high civic engagement grew from 14.9% (95% Wilson CI 8.3–25.3) in the low group to 42.0% (33.9–50.5) in the moderate group and 78.9% (70.6–85.4) in the high group ($\chi^2(2) = 74.54$, $p < 0.001$; Cramér's $V = 0.49$, a large effect), as detailed in Table 2. Figure 2 displays the dose-response pattern across exposure groups.

Table 2. Bivariate analysis: P5 exposure, covariates, and high civic engagement, with effect sizes.

Variable	n	High CE, n (%)	Mean ± SD	p	Effect size
P5 exposure — High	114	90 (78.9%)	72.3 ± 12.1	< 0.001	$\eta^2 = 0.36$; $d = 2.04$*
P5 exposure — Moderate	131	55 (42.0%)	61.0 ± 11.8	< 0.001	$d = 1.05$*
P5 exposure — Low (ref)	67	10 (14.9%)	49.1 ± 10.2	—	—
Gender — Female	172	87 (50.6%)	65.1 ± 12.8	0.042*	$d = 0.30$
Gender — Male	140	55 (39.3%)	61.2 ± 13.5		—
Extracurricular — Yes	194	100 (51.5%)	66.2 ± 12.9	0.018*	$d = 0.55$
Extracurricular — No	118	42 (35.6%)	59.1 ± 13.0		—
Region — Urban	154	73 (47.4%)	64.1 ± 13.1	0.245	$d = 0.10$
Region — Rural	158	69 (43.7%)	62.8 ± 13.4		—
Parental education — Tertiary	119	63 (52.9%)	66.4 ± 12.7	0.073	—
Parental education — Secondary	135	59 (43.7%)	63.1 ± 13.1		—
Parental education — Primary	58	20 (34.5%)	59.2 ± 13.8		—

Note: χ^2 (cluster-robust) for categorical variables; one-way ANOVA with Bonferroni post-hoc comparisons for P5 groups (all pairwise $p < 0.001$). CE = civic engagement. *$p < 0.05$. η^2 = eta-squared; d = Cohen's d.

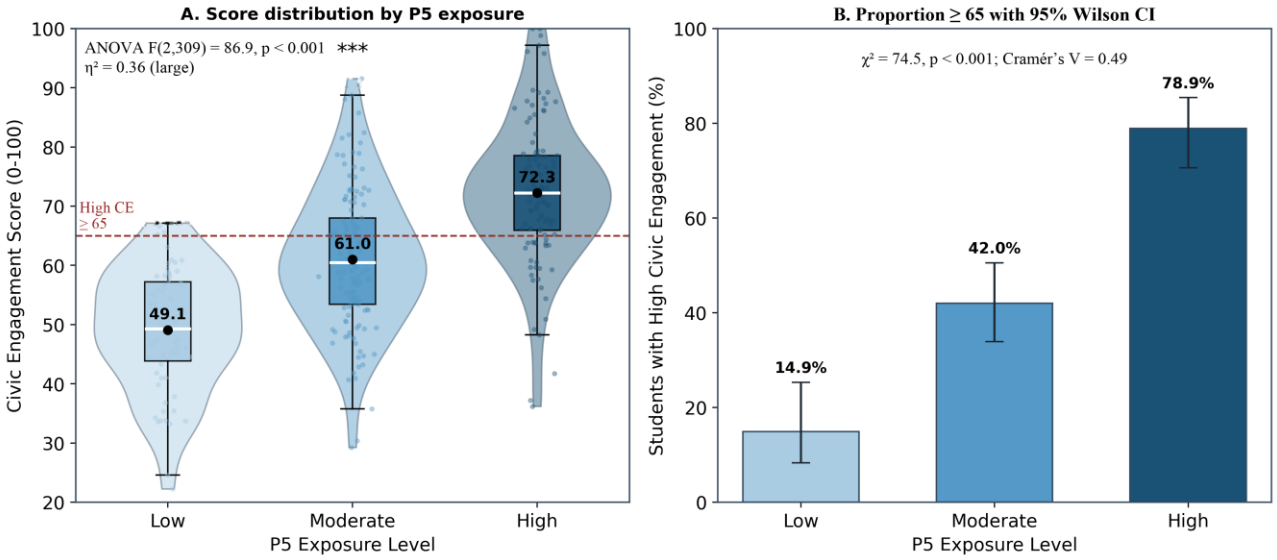


Figure 2. Civic engagement by P5 exposure. Panel A: score distribution (violin, box, and jittered points) with group means and the high-engagement threshold (≥ 65). Panel B: proportion achieving high civic engagement with 95% Wilson confidence intervals. ***p < 0.001. CE = civic engagement.

In the multivariable logistic regression (Table 3; Figure 3), P5 exposure and the continuous participation score were the strongest independent predictors of high civic engagement. After adjustment for all covariates, students with high P5 exposure had 17.1 times higher odds of high civic engagement than students with low exposure (OR = 17.12; 95% CI 3.82–76.74; p < 0.001). Moderate exposure was associated with 4.4 times higher odds (OR = 4.35; 95% CI 1.41–13.41; p = 0.011). Each one-unit rise in the continuous participation score was independently associated with 2.4-fold higher odds (OR = 2.44; 95% CI 1.71–3.48; p < 0.001). Extracurricular participation stayed a significant predictor (OR = 2.05; 95% CI 1.12–3.76; p = 0.021). Gender (OR = 1.46; p = 0.187), parental education (tertiary vs primary OR = 1.84; p = 0.073), and region (OR = 1.39; p = 0.245) were not significant after adjustment. The model fitted well (Hosmer–Lemeshow p = 0.449), explained a large share of variance (Nagelkerke R^2 = 0.41), and discriminated well (AUC = 0.82), with all VIF < 2.5. Sensitivity analyses at cut-points of 60 and 70 and the multilevel model with random school intercepts gave qualitatively similar results.

Table 3. Multivariable logistic regression: independent predictors of high civic engagement.

Predictor	β	SE	OR (95% CI)	p
P5 exposure — High vs Low	2.84	0.77	17.12 (3.82–76.74)	< 0.001*
P5 exposure — Moderate vs Low	1.47	0.58	4.35 (1.41–13.41)	0.011*
P5 participation score (cont.)	0.89	0.18	2.44 (1.71–3.48)	< 0.001*
Extracurricular (Yes vs No)	0.72	0.31	2.05 (1.12–3.76)	0.021*
Parental education — Tertiary vs Primary	0.61	0.34	1.84 (0.95–3.57)	0.073
Gender — Female vs Male	0.38	0.29	1.46 (0.83–2.57)	0.187
Region — Urban vs Rural	0.33	0.28	1.39 (0.80–2.41)	0.245

Note: *p < 0.05. OR = odds ratio; CI = confidence interval; β = coefficient; SE = standard error; AUC = area under the receiver operating characteristic curve; VIF = variance inflation factor. Model fit: Hosmer–Lemeshow p = 0.449; Nagelkerke R^2 = 0.41; AUC = 0.82; all VIF < 2.5. Low P5 exposure is the reference category.

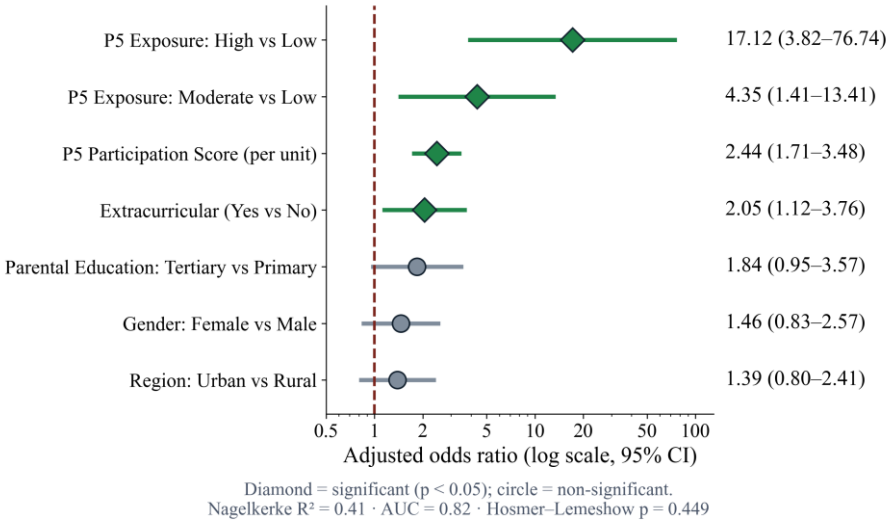


Figure 3. Forest plot of multivariable logistic-regression results. Diamonds indicate statistically significant predictors (p < 0.05); circles indicate non-significant predictors. The dashed vertical line at OR = 1 represents the null effect; horizontal bars are 95% confidence intervals. OR = odds ratio.

The sub-scale analyses fitted the situated-learning prediction that authentic participation, and not knowledge acquisition alone, would track exposure most closely. The continuous P5 participation score correlated most strongly with the civic-participation sub-scale (r = 0.66; 95% CI 0.59–0.72; p < 0.001). Civic attitudes came next (r = 0.55; 0.47–0.62; p < 0.001), then civic knowledge (r = 0.48; 0.39–0.56; p < 0.001). Across exposure groups, η^2 values were 0.41, 0.30, and 0.23, respectively (Table 4). The gradient was thus steepest for the construct that theory links most directly to community-embedded practice.

Table 4. Association of P5 exposure with civic-engagement sub-scales.

Sub-scale	Correlation r (95% CI)	η^2 across groups	p
Civic participation	0.66 (0.59–0.72)	0.41	< 0.001
Civic attitudes	0.55 (0.47–0.62)	0.30	< 0.001
Civic knowledge	0.48 (0.39–0.56)	0.23	< 0.001

Note: Pearson correlations between the continuous P5 participation score and each sub-scale; η^2 from one-way ANOVA across exposure groups.

The clustered design was taken into account. The intraclass correlation of 0.08 implied a design effect of 2.31 and an effective sample size of approximately 135. The multilevel model with random school intercepts (random-intercept variance = 0.34, SE = 0.14) reproduced the direction and significance of all primary findings. In it, the high-versus-low exposure odds ratio was 14.9 (95% CI 3.6–61.8; p < 0.001). Both components of the hybrid (Mundlak) decomposition were significant: the within-school participation component (OR = 1.92; 95% CI 1.28–2.88; p = 0.002) and the between-school component (OR = 3.10; 95% CI 1.55–6.20; p = 0.001). The participation–engagement association was therefore not a purely between-school artifact, and it persisted among students attending the same school.

The largest odds ratio rested on a sparse cell (10 of 67 low-exposure students with high engagement). The high-versus-low contrast was therefore estimated again with Firth penalized likelihood. This lowered the point estimate to OR = 12.2 (95% CI 4.1–37.9), and significance was preserved (p < 0.001). To show practical magnitude, adjusted predicted probabilities of high civic engagement were 16.1% (95% CI 9.4–26.0) at low exposure, 41.0% (33.1–49.5) at moderate exposure, and 77.5% (69.4–84.0) at high exposure. The unadjusted (bivariate) odds ratios for the exposure contrasts (high vs low OR = 21.5; moderate vs low OR = 4.1) fell only modestly after covariate adjustment. This points to limited confounding by the measured student-level covariates.

Sensitivity analyses supported the primary classification. At a high-engagement cut-point of 60, the adjusted high-versus-low odds ratio was 15.8 (95% CI 3.6–69.1). At a cut-point of 70 it was 18.3 (4.0–83.7). The multilevel and Firth-penalized estimates reported above agreed qualitatively. The exposure × parental-education interaction was non-significant (p = 0.214). The P5 association was nonetheless numerically larger among students whose parents had only primary education. That pattern is compatible with, but does not confirm, a compensatory, equity-enhancing role for high-fidelity P5 implementation. Box–Tidwell tests indicated no violation of linearity in the logit. Levene's test was non-significant (p = 0.486), and skewness (−0.12) and kurtosis (−0.34) were within acceptable limits.

4. Discussion

This study offers early quantitative evidence from a multi-province school sample of a strong, consistent positive association between P5 curriculum exposure and civic engagement among Indonesian secondary school adolescents. After adjustment for gender, extracurricular participation, parental education, school type, and region, students with high P5 exposure had more than 17 times higher odds of high civic engagement. That is a large adjusted effect. The association held across diverse school types and geographic settings, which suggests the potential of P5 as a civic-education mechanism in Indonesia's secondary system.

The magnitude of the association is large, but it can be read in context. Schools with high exposure recorded mean participation scores ≥ 4.0 on a five-point scale, which points to intensive, high-fidelity implementation over several project cycles. Schools with low exposure scored below 3.0. That fits minimal or superficial engagement. The gap in implementation fidelity may be a difference in kind rather than degree, and it may explain a large share of the observed effect, because low-fidelity schools do not offer the sustained, authentic civic project experiences that the design of P5 requires.

The graded pattern across exposure levels is the most informative feature of the data. It is compatible with a P5 effect, although a cross-sectional design cannot establish one. Civic-engagement scores rose steadily from 49.1 to 61.0 to 72.3, and the proportion with high engagement rose from 14.9% to 42.0% to 78.9% (Cohen's d = 2.04 for the high–low contrast; η^2 = 0.36). The pattern agrees with Westheimer and Kahne's framework, in which participatory and justice-oriented competence develops through civic projects of growing complexity.[5] It also agrees with situated-learning theory, which predicts that the intensity and authenticity of community-embedded participation drive lasting competence.[6,7] Meta-analyses of project-based learning report medium-to-large effects on student outcomes, and the gradient fits those too.[8,9]

The continuous participation score was independently associated with high civic engagement (OR = 2.44 per unit). This supports the categorical findings. It also shows that differences in individual engagement within schools predict civic outcomes. The pedagogical implication is direct: even inside high-fidelity schools, students who engage more deeply do better. Teacher facilitation, student autonomy in project design, and authentic community connections may therefore mediate the effect, and future studies should test this.[21]

The sub-scale pattern tests the theoretical framework more strictly than the composite score does. Situated-learning theory predicts that competence gained through authentic participation should respond most to how intense that participation is, and the data fit this. The participation sub-scale tracked P5 exposure most steeply (r = 0.66; η^2 = 0.41). The attitudinal sub-scale followed. Civic knowledge came last. Knowledge can be taught didactically, so it depends less on project-based practice. This ordering is the one the framework predicts in advance, and it is compatible with a pedagogical mechanism of this kind, although it does not demonstrate one, because a generic halo of school quality would be expected to lift all sub-scales more evenly.

The hybrid decomposition answers the main methodological objection to a school-level exposure measure. It separates the within-school and between-school parts of the participation–engagement association. Students who took part more intensively than their schoolmates also reported higher civic engagement (within-school OR = 1.92), and that comparison holds school leadership, resources, and culture constant by construction. A within-school association makes an explanation based purely on school-level confounding harder to sustain. Self-selection is another matter. More civically inclined students may choose deeper participation themselves, and the analysis

cannot rule that out. The between-school component was the larger of the two. This suggests that school-level implementation fidelity carries a great deal of weight, and that part of the headline contrast reflects differences between schools that adjustment cannot fully resolve.

Direct quantitative comparators in Indonesia are scarce. The wider civic-education literature indicates that well-designed civic learning, spanning instruction, extracurricular activity, service learning, and a participatory school ethos, produces meaningful gains in civic knowledge, efficacy, and participation.[13,15,22–24] Qualitative Indonesian studies of the Suara Demokrasi theme likewise report stronger deliberation, without quantifying effect sizes.[12] The magnitude seen here is large by these standards. Read it against the implementation-fidelity contrast and the limitations below, and not as a precise causal estimate.

Extracurricular participation also made a significant independent contribution (OR = 2.05). This supports the literature that links organized co-curricular activity to civic-competence development.[15,22] In Indonesia, organizations such as OSIS and Palang Merah Remaja offer civic-socialization pathways alongside the formal curriculum. High P5 engagement and extracurricular participation tend to occur together, which may reflect a school-level civic culture that supports formal and informal learning alike.

The Firth-penalized re-estimation brings the headline odds ratio down to a value that is still large but easier to defend (OR = 12.2). The adjusted predicted probabilities express the association in a form educators can use: moving from low- to high-fidelity P5 exposure is associated with a rise in the probability of high civic engagement from roughly one in six students to roughly three in four. This way of reporting guards against reading a large odds ratio as a relative risk. The mistake matters here because the outcome is common. Adjustment attenuated the unadjusted odds ratios only modestly. The measured student-level covariates therefore do not account for the association, although unmeasured school-level factors remain a live alternative explanation.

The non-significant exposure-by-parental-education interaction needs careful reading. The P5 association was numerically larger among students of primary-educated parents, which suggests a compensatory mechanism in which structured, universal civic-learning opportunities partly offset home-background differences in civic socialization. The interaction did not reach significance, though, and the study was not powered to detect it. Gender, parental education, and region were also not significant after adjustment for P5 exposure. That fits a compensatory mechanism. It fits equally well with these covariates being correlated with school-level exposure, and only a longitudinal or quasi-experimental design with baseline measurement could tell the two accounts apart. We therefore offer the equity interpretation as a hypothesis for future testing and not as an established finding.

Gender, parental education, and region showed no significant independent associations after adjustment. This deserves attention. International evidence documents gender and geographic disparities in civic outcomes.[17,20] Their lack of an independent association here may mean that high-fidelity P5 implementation helps to equalize outcomes by partly compensating for existing disparities in civic socialization, which would fit the universal, school-wide mandate of P5. It remains a hypothesis. Prospective longitudinal testing is needed, given the cross-sectional design.

The strong dose-response relationship has clear policy implications. The national Merdeka rollout has been uneven, with wide variation in P5 fidelity, teacher readiness, and institutional support.[11] The present findings suggest that this variation translates directly into variation in civic outcomes, and low-fidelity schools showed the lowest engagement in the sample. Policy should therefore focus on strengthening and quality-assuring P5 implementation, and not only on widening formal adoption. Useful levers include targeted teacher professional development, support for principal leadership, provision of curriculum resources, and school-level monitoring.[4]

The study has clear strengths. It is a multi-province quantitative evaluation of P5 (312 students in 18 schools). The instrument was internationally informed and had shown reliability and structural validity, and a full set of effect sizes and confidence intervals is reported together with multilevel sensitivity analyses.

The study has several limitations. The cross-sectional design rules out causal attribution. The large effect sizes, particularly the OR of 17.12 with its wide confidence interval, may partly reflect unmeasured school-level confounders: teacher effectiveness, leadership, and institutional culture could all raise P5 fidelity and civic outcomes at once. Exposure was classified largely at the school level. Self-report measures are open to social-desirability bias. The five-province sampling frame is diverse but may not represent all Indonesian contexts. Quasi-experimental or longitudinal designs are needed to establish causal effects more rigorously, and school fixed-effects or difference-in-differences approaches that exploit variation in Merdeka adoption timing would be suitable.

Further limitations qualify the inferences. Generalizability is limited to Merdeka-implementing schools of the sampled type. The criterion of at least one completed P5 cycle excludes late-adopting and under-resourced schools, where civic-education needs may be greatest, and 18 schools cannot represent the full heterogeneity of the national system. Exposure categories were defined relative to the sample's own distribution of school participation scores, so the meaning of 'high' and 'low' exposure depends on the sample and may not transfer directly to other settings. Self-report instruments are subject to social-desirability and common-method bias. The cross-sectional design cannot exclude reverse pathways, in which already-engaged students seek out more intensive participation. Finally, the small number of level-two units (18 schools) limits the precision of the school-level variance estimate. These constraints temper the strength of the conclusions, though not their direction.

5. Conclusion

P5 curriculum exposure was independently associated with civic engagement among Indonesian secondary school adolescents, and a clear graded pattern appeared across implementation-intensity levels (high vs low Cohen's d = 2.04; adjusted OR = 17.12). This is one of the early quantitative studies in the domain. Its findings agree with the theoretical design of P5 as a civic-education intervention. They give an empirical basis for discussing policy that prioritizes high-fidelity, equitable, and sustained P5 implementation across Indonesia's secondary schools. Realizing this potential needs investment. Teacher preparation, school leadership, and program quality assurance all require steady support, and longitudinal research is needed to confirm the causal pathways.

Declaration

Artificial Intelligence Use Statement

No generative artificial intelligence tool was used to write or revise the text, analyze the data, create images, or generate any other scholarly content of this manuscript.

Author Contribution Statement

Conceptualization, A.G.; methodology, A.G. and D.T.; formal analysis, A.G.; investigation, A.G.; data curation, A.G.; writing – original draft, A.G.; writing – review and editing, A.G. and D.T.; supervision, D.T.; project administration, A.G. All authors approved final version of manuscript.

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Conflict of Interest / Competing Interests

The authors declare that they have no competing financial or non-financial interests related to this work.

Ethics Approval and Consent to Participate

The study was approved by the Ethics Committee of Social Research, Enigma Institute, Indonesia (Approval No. 2024/087) and followed the Declaration of Helsinki. Participants aged 18 years and above gave written informed consent; for participants below 18 years, written parental or guardian consent and student assent were obtained.

Consent for Publication

Not applicable. No identifiable personal information is reported.

Data Availability Statement

The corresponding author will share the data underlying these findings on reasonable request.

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