

# STRENGTHENING STUDENTS' ENTREPRENEURIAL INTEREST AS ACTIVE CITIZENSHIP THROUGH PANCASILA STUDENT PROFILE PROJECT LEARNING AND DIGITAL ENTREPRENEURSHIP TRAINING

Mariani Meri Lumban Gaul<sup>1</sup>, Elisa Br. Ginting<sup>2</sup>, Ramon Pagayon Santos<sup>3</sup>

<sup>1), 2)</sup> Sekolah Tinggi Pastoral "Santo Bonaventura" Keuskupan Agung Medan, Medan, Indonesia;

<sup>3)</sup> University of the Philippines College of Music, Quezon, Filipina.

Author Correspondence Email: [merymarbun03@gmail.com](mailto:merymarbun03@gmail.com)

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## ABSTRACT

*This study examines the relationship between P5 learning and students' entrepreneurial interest through digital entrepreneurship training, while interpreting the relationship from an active citizenship perspective. A quantitative cross-sectional survey involved 100 Grade X and XI students at SMA Katolik 1 Kabanjahe, selected from a population of 189 using proportionate stratified random sampling. Data were collected using a 15-item questionnaire with Likert scale and analyzed using PLS-SEM. The results show that P5 learning is positively and significantly associated with digital entrepreneurship training and entrepreneurial interest, and that digital entrepreneurship training significantly mediates the statistical relationship between them. The indirect effect was larger than the direct effect, indicating an important pathway within the observed program. The study contributes to citizenship education by showing that entrepreneurship-oriented P5 activities can support initiative, collaboration, responsibility, problem solving, ethical digital participation, and socially responsible value creation. Schools are recommended to integrate local product development with supervised, accurate, copyright-aware, and privacy-conscious digital promotion.*

## ABSTRAK

Penelitian ini menganalisis hubungan antara pembelajaran P5 dan minat berwirausaha siswa melalui pelatihan kewirausahaan digital, dan menafsirkan hubungan tersebut dari perspektif kewarganegaraan aktif. Penelitian ini menggunakan survei kuantitatif *cross-sectional* terhadap 100 siswa kelas X dan XI SMA Katolik 1 Kabanjahe yang dipilih dari populasi 189 siswa melalui *proportionate stratified random sampling*. Data dikumpulkan menggunakan kuesioner 15 butir dengan skala Likert dan dianalisis menggunakan PLS-SEM. Penelitian menunjukkan bahwa pembelajaran P5 berhubungan positif dan signifikan dengan pelatihan kewirausahaan digital dan minat berwirausaha, sedangkan pelatihan kewirausahaan digital secara signifikan memediasi hubungan statistik antara keduanya. Efek tidak langsung lebih besar daripada efek langsung, yang menunjukkan jalur penting dalam program yang diamati. Penelitian ini berkontribusi pada pendidikan kewarganegaraan dengan menunjukkan bahwa kegiatan P5 berorientasi kewirausahaan dapat memperkuat inisiatif, kolaborasi, tanggung jawab, pemecahan masalah, partisipasi digital yang etis, serta penciptaan nilai yang bertanggung jawab secara sosial. Sekolah disarankan memadukan pengembangan produk lokal dengan promosi digital yang terbimbing, akurat, sadar hak cipta, dan memperhatikan privasi.

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Mariani Meri Lumban Gaul, Elisa Br. Ginting, Ramon Pagayon Santos

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## INTRODUCTION

Entrepreneurial interest among secondary school students is relevant to citizenship education because it concerns how young people respond to social and economic change. When entrepreneurship is understood only as a pathway to personal profit, its civic dimensions, including initiative, responsibility, cooperation, and problem-solving, may be overlooked. Citizenship education should connect knowledge and values with opportunities to make decisions, address problems, and participate in shared life (Hoskins & Crick, 2010; Marlina et al., 2026; Print, 2007). From this perspective, entrepreneurial interest can acquire civic significance when students use their abilities to recognize needs, organize resources, collaborate with others, and create socially useful value.

Participatory citizenship provides the main theoretical foundation for this interpretation. Westheimer and Kahne (2004) distinguish personally responsible citizenship from forms of citizenship that involve participation, collective action, and responses to public problems. This study adopts the participatory perspective. Digital entrepreneurship becomes civically meaningful when students identify needs, organize teamwork, communicate with others, solve problems, and accept responsibility for their decisions. Its civic value, therefore, does not arise merely from generating income, but from connecting economic initiative with cooperation, ethical conduct, public usefulness, and socially responsible value creation. Contemporary citizenship scholarship also emphasizes that participation in digital environments requires critical and ethical awareness rather than technical competence alone (Feriyanisya et al., 2026).

The Merdeka Curriculum provides a relevant learning framework through the *Projek Penguatan Profil Pelajar Pancasila* (Project for Strengthening the Pancasila Student Profile), referred to as P5. P5 encourages contextual project activities that develop independence, creativity, critical reasoning, collaboration, responsibility, and reflection (Keputusan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia Nomor 56/M/2022 tentang Pedoman Penerapan Kurikulum Merdeka; Tanamal & Prasetyo, 2023). Empirical studies in Indonesian schools support this project-based function. Patuti et al. (2023) found that P5 implementation supported character development, cooperation, critical thinking, and creativity among students. Tanamal & Prasetyo (2023) similarly reported that project-based P5 activities strengthened cooperation and independence among secondary students. More recent evidence also shows that contextual P5 activities can foster responsibility, cooperation, creativity, and other character qualities when students engage directly with local and meaningful project experiences Wibowo et al., (2026). These findings indicate that P5 can provide students with practical settings in which Pancasila values are enacted through collaborative tasks rather than learned only as abstract principles.

Digital entrepreneurship extends this project-based experience by enabling students to develop products, create promotional content, use digital platforms, communicate with audiences, and evaluate promotional strategies. Previous studies indicate that digital competence and digital entrepreneurship education are relevant to the formation of entrepreneurial intention, although their effects may operate through different psychological and educational mechanisms (Bachmann et al., 2024; Lam et al., 2025; Liang et al., 2025; Nguyen & Nguyen, 2024). Evidence from Indonesian students also shows the importance of digital-business readiness and related entrepreneurial factors in explaining entrepreneurial intention (Wardoyo et al., 2025). Digital entrepreneurship training can therefore provide a practical bridge between broad project experience and students' confidence and willingness to participate in entrepreneurial activities.

The use of TikTok, Instagram, YouTube, Facebook, and other digital platforms also introduces a dimension of digital citizenship. Digital participation requires more than the ability to operate a platform. Students need to communicate responsibly, evaluate information critically, respect others' rights, and understand the ethical consequences of their online actions. Empirical work on digital citizenship has shown the importance of developing responsible technology use and productive digital participation (Utomo et al., 2023). At the theoretical level, digital citizenship increasingly emphasizes ethical judgment and critical awareness rather than technical competence alone (Feriarysyah et al., 2026). Recent scholarship further positions digital citizenship as a value-based civic domain that can be connected with Pancasila values, ethical awareness, and social responsibility in educational settings (Susi & Shah, 2026). Accordingly, digital promotion within P5 should require students to provide accurate product information, avoid misleading claims, respect copyright and content ownership, protect personal information, and communicate respectfully with audiences.

Existing studies, however, have largely developed these issues in separate lines of inquiry. Research on P5 has primarily examined project implementation, character development, cooperation, independence, and contextual value formation (Susi & Shah, 2026; Tanamal & Prasetyo, 2023; Wibowo et al., 2026). Digital entrepreneurship studies have focused more strongly on digital competence, entrepreneurship education, self-efficacy, creativity, digital literacy, and entrepreneurial intention (Bachmann et al., 2024; Lam et al., 2025; Liang et al., 2025; Nguyen & Nguyen, 2024). Meanwhile, digital citizenship research emphasizes responsible digital participation, critical awareness, ethics, and the integration of civic values into digital environments (Feriarysyah et al., 2026; Susi & Shah, 2026; Utomo et al., 2023). This separation leaves a specific research gap regarding how P5 learning, digital entrepreneurship training, and entrepreneurial interest operate within a single explanatory model among secondary school students. In particular, the role of digital entrepreneurship training as a mediator between P5 learning and entrepreneurial interest remains underexplored, as does the interpretation of this mechanism through the lenses of participatory citizenship and digital ethics.

Kabanjahe Catholic Senior High School 1 (*Sekolah Menengah Atas Katolik 1 Kabanjahe* or *SMA Katolik 1 Kabanjahe*) provides a relevant empirical setting because P5 learning, product development, and digital entrepreneurship training were implemented within one entrepreneurship-themed project sequence. Grade X and XI students collaborated to develop products based on local potential, including aromatherapy candles, and subsequently learned to present and promote them through TikTok, Instagram, YouTube, and Facebook. Although students were familiar with social media, their use had largely focused on personal communication and entertainment rather than planned, productive, and ethically guided participation. The setting, therefore, provided an opportunity to examine how Pancasila-oriented project experiences, entrepreneurial practice, and digital participation were connected within an actual school program.

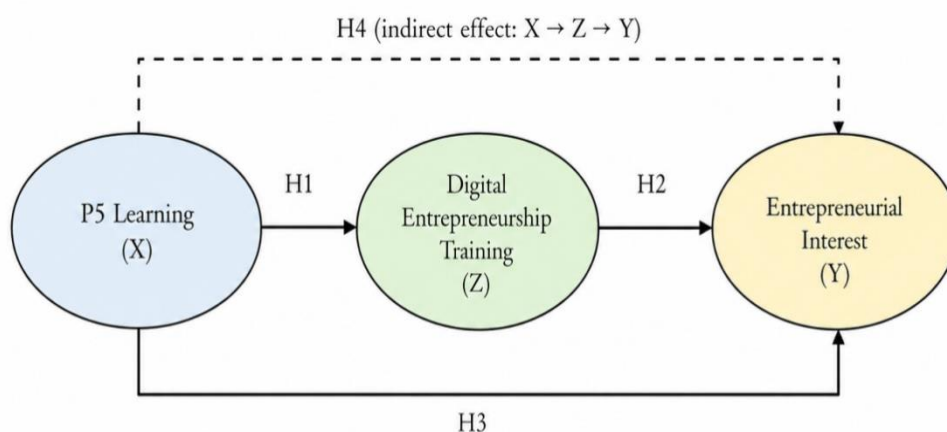
The novelty of this study lies in testing digital entrepreneurship training as a mediating mechanism between P5 learning and entrepreneurial interest among secondary school students, while interpreting the tested relationships through the lens of active citizenship. The study integrates P5 learning, digital entrepreneurship training, and entrepreneurial interest within a single mediation model, whereas previous studies have generally examined these educational domains separately. Active citizenship is not modeled as an additional latent construct. Instead, it functions as an interpretive civic framework for explaining how initiative, collaboration, responsibility, problem solving, ethical digital

participation, and socially responsible value creation may be reflected in the observed educational relationships.

Based on the theoretical and empirical arguments developed above, this study proposes a mediation model in which P5 learning is associated with entrepreneurial interest both directly and indirectly through digital entrepreneurship training. P5 learning represents students' experiences of project planning, creativity, independence, collaboration, responsibility, and reflection. Digital entrepreneurship training involves practical activities such as product development, digital content creation, platform use, audience communication, and promotion evaluation. Entrepreneurial interest represents students' readiness and willingness to initiate and develop entrepreneurial activities. Active citizenship remains outside the statistical model and is used to interpret the civic significance of the relationships among these three constructs.

Accordingly, this study aims to test the direct and indirect relationships among P5 learning, digital entrepreneurship training, and entrepreneurial interest, and to interpret the observed relationships through an active-citizenship framework.

**Figure 1.** Research Model and Civic Interpretation



**Source:** Research Data Processing (2025)

Figure 1 illustrates the proposed direct and indirect relationships among the three statistical constructs. P5 learning is hypothesized to be positively associated with entrepreneurial interest both directly and indirectly through digital entrepreneurship training. Active citizenship is positioned outside the structural model because it is not measured as a separate latent variable. Instead, it provides an interpretive framework for discussing how initiative, collaboration, responsibility, problem solving, ethical digital participation, and socially responsible value creation may be reflected in the observed relationships.

The proposed hypotheses follow the sequential logic of the entrepreneurship-themed P5 program and the empirical evidence reviewed above. P5 provides project-based experiences in which students plan activities, collaborate, develop products, solve problems, and assume responsibility. Digital entrepreneurship training extends these experiences through digital content creation, platform use, audience communication, and evaluation of promotion. Previous research indicates that P5 activities are associated with students' character development and collaborative competencies (Patuti et al., 2023; Tanamal & Prasetyo, 2023) while digital competence and digital entrepreneurship education are associated with entrepreneurial intention (Bachmann et al., 2024; Lam et al., 2025; Liang et al., 2025; Nguyen & Nguyen, 2024). These findings provide a basis for examining whether

digital entrepreneurship training serves as an intermediate statistical mechanism linking P5 learning to entrepreneurial interest.

Based on the research model in Figure 1, the hypotheses tested in this study are formulated as follows:

- H1 : P5 learning is positively associated with students' digital entrepreneurship training.
- H2 : Digital entrepreneurship training is positively associated with students' entrepreneurial interest
- H3 : P5 learning is positively associated with students' entrepreneurial interest.
- H4 : Digital entrepreneurship training statistically mediates the relationship between P5 learning and students' entrepreneurial interest.

## METHOD

This study employed a quantitative cross-sectional survey to examine the statistical associations among P5 learning, digital entrepreneurship training, and students' entrepreneurial interest (Creswell & Creswell, 2018). The study was conducted at Kabanjahe Catholic Senior High School 1 (*Sekolah Menengah Atas Katolik 1 Kabanjahe* or *SMA Katolik 1 Kabanjahe*) during the entrepreneurship-themed P5 program. Participants were Grade X and XI students who had completed the same general sequence of project planning, product development, and digital promotion. The structural model specified P5 learning as the exogenous construct, digital entrepreneurship training as the mediating construct, and entrepreneurial interest as the endogenous construct. PLS-SEM was used to estimate the direct and indirect relationships among the three constructs and to explain variance in the endogenous constructs. Given the cross-sectional design, the estimated relationships are interpreted as statistical associations within the observed school context rather than as evidence of temporal causality

The population comprised 189 Grade X and XI students. Using the Slovin formula with a 5% margin of error yielded an initial target of approximately 128 respondents. One hundred questionnaires were returned complete and met the requirements for analysis, representing a valid response rate of 78.1 percent. The final sample therefore consisted of 100 students. Proportionate stratified random sampling was used to preserve the representation of both grade levels. The sampling frame was separated by grade, and respondents were selected randomly within each stratum in proportion to its enrollment. PLS-SEM was selected because the study focused on estimating a mediation model and explaining variance in the endogenous constructs, rather than solely because of the available sample size (Hair et al., 2019).

Data were collected using a structured questionnaire comprising 15 items, with five indicators assigned to each of the three measured constructs. Responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was administered face-to-face in the classroom under researcher supervision. Before completing the questionnaire, students received an explanation of the research purpose, response procedures, voluntary participation, anonymity, and the academic use of the data. Completed questionnaires were checked before data entry to identify missing or inconsistent responses. The questionnaire items were adapted from the literature on P5 learning, experiential project learning, digital entrepreneurship training, and entrepreneurial interest. Table 1 presents the constructs, indicators, indicator codes, measurement focus, and sources used for instrument adaptation.

**Table 1.** Instrument Grid of Research Variables

| Variable                                | Indicators                                                                                                 | Indicator Codes | Main Measurement Aspects                                                                                     | Sources for Adaptation                                                                          |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| P5 Learning (P5)                        | Project planning and participation; independence; creativity; collaboration; responsibility and reflection | P5 1 to P5 5    | Students' experience of organizing, completing, evaluating, and reflecting on entrepreneurship project tasks | Kemendikbudristek (2022); Tanamal and Prasetyo (Tanamal & Prasetyo, 2023); Patuti et al. (2023) |
| Digital Entrepreneurship Training (DET) | Product design; content creation; social media marketing; platform use; promotion evaluation               | DET 1 to DET 5  | Practical ability to prepare products, create digital messages, use platforms, and assess online promotion   | Wibowo et al. (2023); Jaya et al. (2023); Gaul et al. (2024)                                    |
| Entrepreneurial Interest (IE)           | Business intention; confidence; opportunity recognition; persistence; product development willingness      | IE 1 to IE 5    | Readiness and willingness to initiate, continue, and develop entrepreneurial activities                      | Nuryanto et al. (2019); Ferreira & Smail (2024) Wardoyo (2025)                                  |

**Source:** Adapted from the Literature and Processed by the Authors (2025)

The indicators were designed to represent the distinct role of each construct. P5 learning covered project planning and participation, independent task completion, creative product development, collaboration, responsibility, and reflection. Digital entrepreneurship training covered product design, digital content creation, social media marketing, platform use, and evaluation of online promotion. Entrepreneurial interest covered intention to undertake business activities, confidence, opportunity recognition, persistence, and willingness to continue developing products. These indicators connect the statistical model to the learning sequence experienced by students while preserving the conceptual distinction between project learning, training experience, and entrepreneurial disposition.

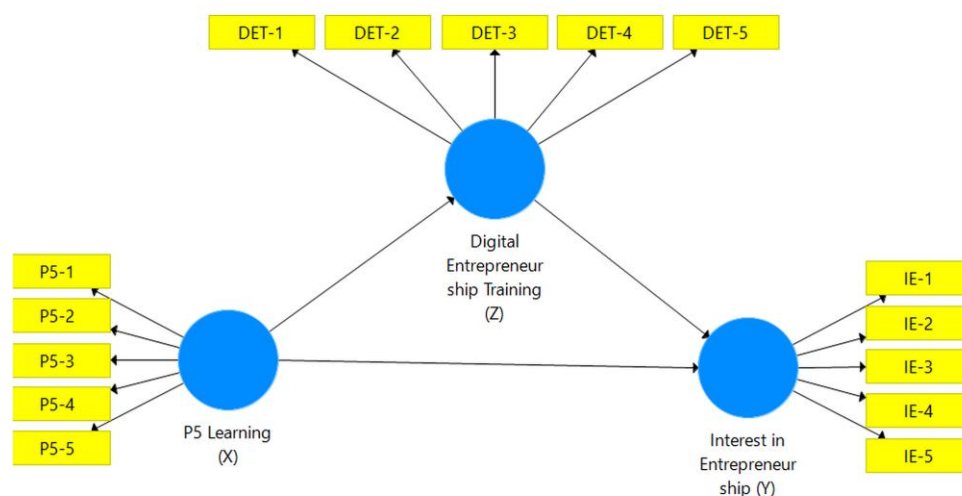
Data were analyzed with partial least squares structural equation modeling using SmartPLS 3.0. The analysis proceeded in two stages. First, the reflective measurement model was assessed through outer loadings, average variance extracted, cross-loadings, Cronbach's alpha, and composite reliability. Outer loadings above 0.70 and average variance extracted above 0.50 were used to assess convergent validity, while reliability coefficients above 0.70 indicated adequate internal consistency (Hair et al., 2019). Cross-loadings were inspected to determine whether each indicator loaded most strongly on its intended construct. Because all constructs were specified reflectively, indicator-level VIF was not treated as a primary criterion for measurement. Collinearity was instead assessed among predictor constructs in the structural model.

Second, the structural model was evaluated through inner VIF, full collinearity VIF, coefficients of determination, path coefficients, bootstrapped t statistics and p values, indirect effects, and  $f^2$  (effect sizes). Inner VIF values below 5 were interpreted as acceptable for predictor collinearity. Full collinearity VIF was used as a diagnostic for common method bias because all responses came from the same questionnaire and were collected at the same time. Values below 3.3 suggest that common method bias is not a serious concern, whereas higher values require explicit limitation and cautious interpretation (Kock, 2015). The legacy global goodness-of-fit index was also calculated as the square root of the product of the mean average variance extracted and the mean R<sup>2</sup>. It was reported only as supplementary information because contemporary PLS SEM guidance does not treat this index as a stand-alone acceptance test. Bootstrapping was used to test H1 through H4, with p below 0.05 as the significance criterion.

## RESULTS AND DISCUSSION

The PLS-SEM results are presented in two stages. First, the measurement model was evaluated to assess indicator reliability, convergent validity, discriminant validity, and internal consistency. Second, the structural model was examined through predictor collinearity, coefficients of determination, direct and indirect path estimates, statistical significance, and effect sizes. Because P5 learning and digital entrepreneurship training were implemented within a single integrated school program, the structural estimates are interpreted alongside the collinearity and common method diagnostics. Discussion of the substantive meaning of the findings is presented after the statistical results.

**Figure 2.** Latent Variable Model



Source: Research Data Processing (2025)

### 1. Measurement Model Assessment

The measurement model was assessed to determine whether each item represented its intended construct with adequate consistency. All three constructs were reflective. Accordingly, item quality was judged through outer loadings and average variance extracted, construct separation through cross loadings, and internal consistency through Cronbach's alpha and composite reliability.

**Table 2.** Outer Loading Results of Convergent Validity Test

| Statement | P5 Learning | Digital Entrepreneurship Training | Entrepreneurial Interest | Information |
|-----------|-------------|-----------------------------------|--------------------------|-------------|
| P5-1      | 0.824       |                                   |                          | Valid       |
| P5-2      | 0.872       |                                   |                          | Valid       |
| P5-3      | 0.949       |                                   |                          | Valid       |
| P5-4      | 0.947       |                                   |                          | Valid       |
| P5-5      | 0.850       |                                   |                          | Valid       |
| DET-1     |             | 0.789                             |                          | Valid       |
| DET-2     |             | 0.884                             |                          | Valid       |
| DET-3     |             | 0.985                             |                          | Valid       |
| DET-4     |             | 0.978                             |                          | Valid       |
| DET-5     |             | 0.974                             |                          | Valid       |
| IE-1      |             |                                   | 0.895                    | Valid       |
| IE-2      |             |                                   | 0.924                    | Valid       |
| IE-3      |             |                                   | 0.908                    | Valid       |
| IE-4      |             |                                   | 0.966                    | Valid       |
| IE-5      |             |                                   | 0.870                    | Valid       |

Source: Research Data Processing (2025)

All 15 indicators exceeded the recommended outer-loading threshold of 0.70. Loadings ranged from 0.824 to 0.949 for P5 learning, from 0.789 to 0.985 for digital entrepreneurship training, and from 0.870 to 0.966 for entrepreneurial interest. These results indicate adequate indicator reliability. However, several indicators showed similarly high relationships with conceptually related constructs, making discriminant validity an important consideration in the subsequent assessment.

**Table 3.** Construct Reliability, Convergent Validity, and AVE

| Construct                         | Cronbach's Alpha | Composite Reliability | AVE   | Assessment |
|-----------------------------------|------------------|-----------------------|-------|------------|
| P5 Learning                       | 0.933            | 0.950                 | 0.792 | Acceptable |
| Digital Entrepreneurship Training | 0.956            | 0.967                 | 0.856 | Acceptable |
| Entrepreneurial Interest          | 0.950            | 0.962                 | 0.834 | Acceptable |

Source: Research Data Processing (2025)

Cronbach's alpha ranged from 0.933 to 0.956, while composite reliability ranged from 0.950 to 0.967. All reliability coefficients exceeded 0.70. AVE values ranged from 0.792 to 0.856 and therefore exceeded the 0.50 criterion for convergent validity. The three constructs consequently demonstrated strong internal consistency and convergent validity. The very high reliability coefficients, however, were considered together with discriminant validity because closely related item content and the integrated learning context may have contributed to substantial shared variance.

Discriminant validity was examined through cross-loadings. Each indicator was expected to load more strongly on its assigned construct than on the other constructs. This test was especially important because P5 learning and digital entrepreneurship training occurred within the same school program.

**Table 4.** Cross-Loading Results of Discriminant Validity Test

| Instrument | P5 Learning  | Digital Entrepreneurship Training | Entrepreneurial Interest | Information |
|------------|--------------|-----------------------------------|--------------------------|-------------|
| P5-1       | <b>0.824</b> | 0.744                             | 0.752                    | Valid       |
| P5-2       | <b>0.872</b> | 0.823                             | 0.814                    | Valid       |
| P5-3       | <b>0.949</b> | 0.932                             | 0.936                    | Valid       |
| P5-4       | <b>0.947</b> | 0.939                             | 0.944                    | Valid       |
| P5-5       | <b>0.850</b> | 0.760                             | 0.782                    | Valid       |
| DET-1      | 0.694        | <b>0.789</b>                      | 0.713                    | Valid       |
| DET-2      | 0.810        | <b>0.884</b>                      | 0.824                    | Valid       |
| DET-3      | 0.965        | <b>0.985</b>                      | 0.977                    | Valid       |
| DET-4      | 0.942        | <b>0.978</b>                      | 0.964                    | Valid       |
| DET-5      | 0.945        | <b>0.974</b>                      | 0.956                    | Valid       |
| IE-1       | 0.802        | 0.868                             | <b>0.895</b>             | Valid       |
| IE-2       | 0.876        | 0.890                             | <b>0.924</b>             | Valid       |
| IE-3       | 0.872        | 0.884                             | <b>0.908</b>             | Valid       |
| IE-4       | 0.930        | 0.946                             | <b>0.966</b>             | Valid       |
| IE-5       | 0.824        | 0.833                             | <b>0.870</b>             | Valid       |

Source: Research Data Processing (2025)

Every item had its highest loading on the construct to which it was assigned. The formal cross-loading criterion was therefore satisfied. Several differences were small, particularly among items reflecting connected experiences such as collaboration, product work, and digital promotion. The result supports discriminant validity at the item level, but it also signals limited empirical separation between the constructs. This pattern is consistent with the high inner VIF and full collinearity VIF values reported in the structural model and requires cautious interpretation.

## 2. Structural Model Assessment

The structural model was evaluated through predictor collinearity, common method diagnostics, explanatory power, direct and indirect path estimates, and effect sizes. These diagnostics were examined before interpreting the substantive relationships because P5 learning and digital entrepreneurship training were implemented within the same entrepreneurship-themed project sequence. The coefficients are reported as generated by SmartPLS, but their magnitude is interpreted cautiously because the design produced substantial overlap among several constructs.

### a. Inner VIF

Inner VIF was examined before interpreting the paths. A value below 5 indicates that predictor overlap is unlikely to distort a structural coefficient, while a value above 5 signals substantial collinearity and requires caution (Hair et al., 2019). Table 5 presents the construct-level results. Because all measurement models were reflective, this construct-level assessment was more relevant than the formative indicator VIF.

**Table 5.** Inner VIF Values

| Relationship                                                  | VIF    | Information             |
|---------------------------------------------------------------|--------|-------------------------|
| P5 Learning -> Digital Entrepreneurship Training              | 1.000  | No collinearity concern |
| P5 Learning -> Entrepreneurial Interest                       | 10.060 | High collinearity       |
| Digital Entrepreneurship Training -> Entrepreneurial Interest | 10.060 | High collinearity       |

Source: Research Data Processing (2025)

The P5 learning-to-digital entrepreneurship training relationship had an internal VIF of 1.000 because digital entrepreneurship training had only one predictor. When entrepreneurial interest was simultaneously predicted by P5 learning and digital entrepreneurship training, both predictors produced VIF values of 10.060. These values indicate substantial predictor collinearity. The separate direct coefficients for P5 learning and digital entrepreneurship training should therefore be interpreted cautiously because the two predictors share considerable variance within the integrated P5 program.

#### b. Common Method Bias

Common method bias was assessed because the same students completed all measures in one questionnaire at one point in time. Full collinearity VIF below 3.3 was used as the diagnostic threshold proposed by Kock (2015). Values above this threshold were not treated as proof of bias, but as evidence that common method variance or strong substantive overlap could influence the estimates.

**Table 6.** Full Collinearity VIF for Common Method Bias Assessment

| Construct                         | Full Collinearity VIF | Information                                   |
|-----------------------------------|-----------------------|-----------------------------------------------|
| P5 Learning                       | 2.075                 | No serious common-method concern              |
| Digital Entrepreneurship Training | 100.031               | Serious common-method/shared-variance concern |
| Entrepreneurial Interest          | 101.303               | Serious common-method/shared-variance concern |

Source: Research Data Processing (2025)

The full collinearity VIF for P5 learning was 2.075, while digital entrepreneurship training and entrepreneurial interest produced values of 100.031 and 101.303, respectively. The latter values substantially exceeded the diagnostic threshold of 3.3. They therefore indicate a serious common-method or shared-variance concern rather than establishing common-method bias as a definitive explanation. This result reinforces the need for cautious interpretation of the structural coefficients.

#### c. R Square ( $R^2$ )

$R^2$  indicates the proportion of variance in an endogenous construct explained by its predictors. Values of approximately 0.25, 0.50, and 0.75 are often described as weak, moderate, and substantial in PLS SEM, although interpretation must remain sensitive to the research context (Hair et al., 2019).

**Table 7.** R Square ( $R^2$ ) Test Results

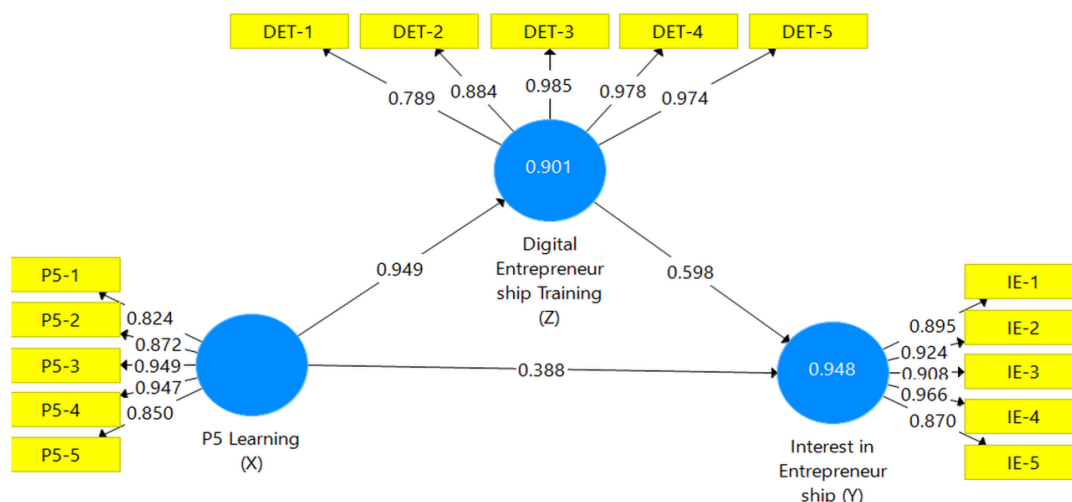
| Dependent Variable                | R Square | R Square Adjusted |
|-----------------------------------|----------|-------------------|
| Entrepreneurial Interest          | 0.948    | 0.947             |
| Digital Entrepreneurship Training | 0.901    | 0.900             |

Source: Research Data Processing (2025)

The model explained 94.8% of the variance in entrepreneurial interest ( $R^2 = 0.948$ ; adjusted  $R^2 = 0.947$ ) and 90.1% of the variance in digital entrepreneurship training ( $R^2 = 0.901$ ; adjusted  $R^2 = 0.900$ ). These values indicate substantial in-sample explanatory power. However, the high  $R^2$  values should be interpreted together with the collinearity diagnostics and should not be treated as evidence of equivalent predictive performance outside the observed sample.

#### d. Supplementary Global Goodness of Fit (GoF)

Using the mean average variance extracted of 0.827 and the mean  $R^2$  of 0.925, the legacy global goodness-of-fit index was 0.875. This value is above the conventional large benchmark of 0.36. It is reported only as supplementary descriptive evidence of the model's overall explanatory strength; it does not resolve the high collinearity and common-method diagnostics and is not used as a stand-alone basis for accepting the PLS-SEM model (Hair et al., 2019).

**Figure 3.** PLS-SEM Algorithm Results

Source: Research Data Processing (2025)

#### e. Hypothesis Testing

Hypotheses were tested by bootstrapping. Path coefficients indicate direction and magnitude, while t statistics and p values test whether estimates differ from zero in the resamples. Statistical significance was evaluated at  $p < 0.05$  and interpreted alongside the collinearity and common method diagnostics. Table 8 combines the three direct effects (H1-H3) and the indirect mediation effect (H4) so that the full hypothesis pattern can be evaluated in one place.

**Table 8.** Path Coefficient Results of Direct Effect Bootstrapping

| H | Relationship | $\beta$ | SE | t | p | $f^2$ | Decision |
|---|--------------|---------|----|---|---|-------|----------|
|---|--------------|---------|----|---|---|-------|----------|

|    |                                                                            |       |       |        |        |       |           |
|----|----------------------------------------------------------------------------|-------|-------|--------|--------|-------|-----------|
| H1 | P5 Learning → Digital Entrepreneurship Training                            | 0.949 | 0.011 | 86.227 | <0.001 | 9.060 | Supported |
| H2 | Digital Entrepreneurship Training → Entrepreneurial Interest               | 0.598 | 0.084 | 7.093  | <0.001 | 0.681 | Supported |
| H3 | P5 Learning → Entrepreneurial Interest                                     | 0.388 | 0.085 | 4.547  | <0.001 | 0.287 | Supported |
| H4 | P5 Learning → Digital Entrepreneurship Training → Entrepreneurial Interest | 0.567 | 0.079 | 7.166  | <0.001 | –     | Supported |

Source: Research Data Processing (2025)

The mediation finding constitutes the study's principal empirical contribution. Digital entrepreneurship training appears to translate the broader values and project experiences developed through P5 into practical entrepreneurial action. Students not only participated in product development but also learned to present products, create digital content, communicate with audiences, and evaluate promotional strategies. In this sense, the practical digital component provided a statistical bridge between project-based P5 learning and entrepreneurial interest. Nevertheless, because P5 learning and digital entrepreneurship training were implemented within the same program and measured through the same survey occasion, this finding is more appropriately described as statistical mediation within the observed school context rather than definitive causal mediation.

From an active citizenship perspective, this mechanism illustrates how educational experiences can move beyond individual skill development toward meaningful participation in social contexts. Entrepreneurial activities within P5 should not be understood merely as preparation for economic activities, but also as opportunities for students to develop civic capacities through initiative, collaboration, responsibility, decision-making, and problem-solving. Entrepreneurial interest is not equivalent to active citizenship; rather, it acquires civic significance when students use their abilities to identify needs, cooperate with others, and create socially useful value. This interpretation is consistent with the participatory citizenship perspective proposed by Westheimer & Kahne (2004), which emphasizes that citizenship involves active participation, collective engagement, and responses to shared social challenges rather than only individual responsibility. Similarly, active citizenship competencies involve students' ability to exercise agency, cooperate, take responsibility, and participate in solving problems within their communities (Hidayah et al., 2025; Hoskins & Crick, 2010).

The pattern of relationships in this study reflects this civic process. P5 learning created a collaborative environment where students experienced planning, division of roles, collective decision-making, and reflection. These experiences represent important dimensions of active citizenship because students were positioned as active participants who contributed to achieving shared goals. Meanwhile, digital entrepreneurship training extended these experiences by providing practical spaces for students to communicate, interact with audiences, and participate in digital environments. Thus, the relationship between P5 learning, digital entrepreneurship training, and entrepreneurial interest demonstrates how school-based entrepreneurship projects may function as a context for developing responsible and participatory citizens.

The digital dimension further strengthens the connection between entrepreneurship education and active citizenship. Digital entrepreneurship training not only involves the technical ability to use online platforms but also requires ethical

awareness and responsibility in digital interactions. Activities involving TikTok, Instagram, YouTube, Facebook, and other platforms can become forms of civic learning when students are required to provide accurate product information, avoid misleading claims, respect copyright and content ownership, protect personal information, and communicate responsibly with audiences. These practices connect entrepreneurship with the rights, responsibilities, ethical judgment, and accountability associated with digital citizenship (Feriyansyah et al., 2026; Iskandar et al., 2025; Utomo et al., 2023; Zhong, J., & Zheng, 2023). Therefore, the educational value of digital entrepreneurship lies not only in students' ability to promote products online but also in their capacity to participate ethically, critically, and productively in digital society.

The findings are also consistent with previous studies demonstrating that P5 activities contribute to collaboration, responsibility, creativity, and character development among students (Patuti et al., 2023; Tanamal & Prasetyo, 2023; Wibowo et al., 2023). In addition, previous research indicates that digital entrepreneurship education and digital competence are associated with entrepreneurial intention (Bachmann et al., 2024; Lam et al., 2025; Liang et al., 2025; Nguyen & Nguyen, 2024). However, this study extends these discussions by interpreting these relationships through an active citizenship perspective. The contribution of this study is not to position entrepreneurial interest as an indicator of active citizenship, but to demonstrate how entrepreneurship-oriented P5 activities may create civic learning opportunities when economic initiatives are connected with cooperation, ethical digital participation, and socially responsible value creation.

Taken together, the findings identify a school-level mechanism in which P5 establishes a project environment grounded in creativity, collaboration, independence, and responsibility, while digital entrepreneurship training translates these values into practical digital action. Through this process, students develop not only entrepreneurial orientations but also civic dispositions required for participation in contemporary society. The integration of project-based learning, entrepreneurship education, and digital citizenship therefore provides a meaningful pathway for schools to strengthen students' active citizenship.

Several limitations constrain the interpretation and generalizability of the findings. First, the study was conducted in a single school using cross-sectional self-report data, with all constructs measured using the same questionnaire at a single point in time. Second, P5 learning and digital entrepreneurship training were implemented as components of one integrated program, resulting in substantial predictor collinearity and exceptionally high full-collinearity VIF values for two constructs. These conditions may have increased shared variance and limited strong causal interpretation. Future studies should involve multiple schools, separate measurement occasions, and multi-source or performance-based measures. Further research may also examine additional factors such as entrepreneurial self-efficacy, family support, digital literacy, and school entrepreneurial climate.

## CONCLUSION

This study examined the relationship between P5 learning and entrepreneurial interest through digital entrepreneurship training among Grade X and XI students at SMA RK 1 Kabanjahe and interpreted the observed relationships through an active-citizenship perspective. The findings showed that P5 learning was positively associated with digital entrepreneurship training and entrepreneurial interest, and that digital entrepreneurship training was also positively associated with entrepreneurial interest. The specific indirect relationship between P5 learning and entrepreneurial interest, mediated by digital

entrepreneurship training, was also statistically significant. The indirect coefficient ( $\beta = 0.567$ ) was numerically larger than the direct coefficient from P5 learning to entrepreneurial interest ( $\beta = 0.388$ ), indicating that digital entrepreneurship training represented an important statistical pathway within the observed school program.

From an active-citizenship perspective, the findings suggest that entrepreneurship-oriented P5 activities can acquire civic significance when students engage in initiative, collaboration, responsibility, problem-solving, ethical digital participation, and socially responsible value creation. Digital entrepreneurship training can support this process by connecting project-based learning with practical activities such as product development, digital content creation, platform use, audience communication, and evaluation of promotion. Entrepreneurial interest, however, should not be interpreted as equivalent to active citizenship; rather, its civic meaning emerges when entrepreneurial activities are practiced responsibly and directed toward socially useful participation.

The findings should be interpreted within the specific context of the study. The single-school, cross-sectional, and same-source design, together with substantial predictor collinearity and high shared variance, limits causal interpretation and generalization. Future studies should examine the proposed relationships across multiple schools, use longitudinal or time-separated measurements, and incorporate multi-source or performance-based data. For educational practice, schools may strengthen entrepreneurship-themed P5 programs by integrating local product development with supervised digital promotion, accurate communication, copyright awareness, privacy protection, and reflection on social responsibility.

## **DECLARATIONS**

### **1. About Authors**

Mariani Meri Lumban Gaul (MMLG)<sup>ID</sup>: <https://orcid.org/0009-0007-9588-7175>

Elisa Br Ginting (EBG): <https://orcid.org/0009-0007-0610-5961>

Ramon Pagayon Santos (RPS): <https://orcid.org/0009-0000-7954-4999>

### **2. Authors Contributions**

The first author developed the research idea and objectives, reviewed the literature, coordinated data collection, and prepared the initial manuscript. The second author developed the methodological framework, conducted the data analysis, interpreted the findings, and strengthened the discussion. The third author provided scholarly guidance, reviewed the manuscript, examined the conclusions, and approved the final version. All authors discussed the findings, revised the article, and approved the version submitted for publication.

### **3. Conflicts of Interest**

The authors declare no conflict of interest related to the design, implementation, analysis, interpretation, preparation, or publication of this study. The research was conducted independently and was not influenced by personal, financial, institutional, or professional interests.

### **4. Generative AI and AI-Assisted in the Writing Process**

During revision, the authors used digital language tools only for limited grammar and readability checks. The research design, data collection, statistical analysis, interpretation,

selection and verification of references, scholarly argument, and final wording were reviewed and approved by the authors, who retain full responsibility for the manuscript.

## 5. Data Availability Statement

The anonymized questionnaire responses and processed SmartPLS data are available in the authors' Google Drive repository at: <https://drive.google.com/drive/u/0/folders/18O9PHZUkeSXFLvAuRKYUfVR10UoCsSGN>

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