

Development and Preliminary Evaluation of PjBL-Based Google Sites for Teaching Advertisements, Slogans, and Posters

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Abstract

Background — Package B learners in nonformal education often combine study with employment, requiring flexible learning resources without reducing opportunities for active and creative work.

Research Urgency — Limited evidence addresses PjBL-based Google Sites in Indonesian equivalency education while examining both conceptual understanding and creative products, particularly for learners who need flexible access.

Research Objectives — This study developed and conducted a preliminary evaluation of Project-Based Learning (PjBL)-based Google Sites teaching materials for advertisements, slogans, and posters.

Research Method — A Research and Development design followed the ADDIE stages: analysis, design, development, implementation, and evaluation. Needs data were collected from a Grade VIII Package B class and its teacher. One content expert, one educational-technology expert, and one practitioner assessed product validity, and a one-group pretest-posttest pilot involved 10 learners. Conceptual understanding was measured with a written test, while creative performance was assessed from advertisement, slogan, and poster products.

Research Findings — Expert validation averaged 90.83%, indicating high feasibility. Conceptual-understanding scores increased from $M = 66.50$ ($SD = 8.51$) to $M = 83.50$ ($SD = 5.30$); the exact Wilcoxon test showed $W = 0$, $p = .004$, with a large effect ($r = .85$). The mean normalized gain was 0.482, indicating moderate improvement. Advertisement, slogan, and poster scores also increased (all exact $p = .002$), although the rubric was applied by one assessor.

Research Conclusion — The findings support the product's feasibility and indicate preliminary short-term improvement, but they do not establish causal effectiveness because the pilot used a small single-group design.

Research Novelty/Contribution — The study contributes a contextualised integration of PjBL, multimodal Google Sites resources, and authentic advertisement, slogan, and poster production for working Package B learners, while reporting preliminary evidence for both conceptual understanding and creative products.

Keywords: conceptual understanding; creativity; Google Sites; nonformal education

How to Cite:

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INTRODUCTION

Indonesia's curriculum policy gives education units flexibility to design contextual, competency-oriented learning. The 2025 curriculum regulation retains the Merdeka Curriculum and strengthens integrative learning, conceptual understanding, creativity, collaboration, and communication, including in equivalency education (Ministry of Primary and Secondary Education, 2025). These priorities are relevant to Package B programmes, which serve learners with varied educational histories and schedules. Recent nonformal-education research likewise emphasizes adaptive pedagogy, learner needs, community relevance, and 21st-century capabilities (Ahmad et al., 2023; Adeoye et al., 2024; Hayat et al., 2024; Prasetyo et al., 2024).

Flexible provision does not automatically produce meaningful learning. Digital resources may extend access for learners who cannot attend every face-to-face meeting, but their value depends on appropriate pedagogy, usable design, reliable access, and teacher support (Harahap et al., 2022; UNESCO, 2023; Morris & Rohs, 2021; Saripah et al., 2025). At the participating Learning Activity Centre (Sanggar Kegiatan Belajar [SKB]) in Semarang Regency, the initial needs analysis indicated that some learners missed classroom meetings because of work obligations. Learners also had difficulty distinguishing the concepts and communicative functions of advertisements, slogans, and posters and needed structured opportunities to produce their own examples. These needs are consistent with research linking meaningful digital learning to access, literacy, guidance, and contextual use (Audrin & Audrin, 2022; Farias-Gaytan et al., 2022; Nugroho et al., 2024; Darmawan et al., 2025).

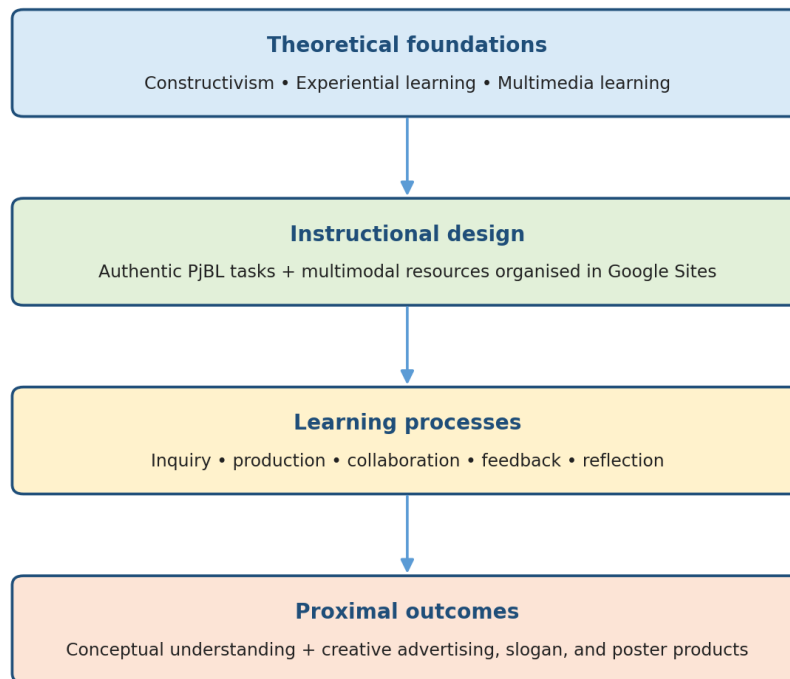
Project-Based Learning (PjBL) offers a relevant response because it organises learning around authentic questions, sustained inquiry, product creation, feedback, and reflection. Recent reviews and meta-analyses show that PjBL can support academic achievement, engagement, motivation, writing, collaboration, and higher-order thinking, although effects vary by context, duration, task design, and implementation quality (Ferrero et al., 2021; Zhang & Ma, 2023; Wijnia et al., 2024; Cahyono et al., 2024; Al-Kamzari & Alias, 2025; Sari et al., 2024). Advertisements, slogans, and posters provide suitable projects because learners must connect conceptual knowledge with purposeful written and visual communication.

Google Sites can serve as an organising platform rather than a teaching method. It can combine text, images, video, quizzes, instructions, and links within a single web environment. Previous studies have reported the feasibility of Google Sites for language and science learning and possible gains in achievement (Jauza & Lubis, 2023; Silfiani et al., 2025; Reskiyati et al., 2023). More broadly, recent nonformal-education studies emphasise technology-integrated learning design, digital competence, and ICT-supported project activity in equivalency and community education (Noor et al., 2024; Santoso et al., 2024; Sutimin et al., 2025). However, most Google Sites studies have focused on formal schools, single subject outcomes, or product feasibility. Limited evidence addresses PjBL-based Google Sites in Indonesian equivalency education while examining both conceptual understanding and creative products.

The present study addresses that specific gap. Its contribution is not the use of Google Sites alone. It lies in the contextualised integration of PjBL, multimodal resources, and authentic language products for working Package B learners. The study asked two questions: (1) What are the characteristics and expert-rated validity of the developed teaching materials? and (2) What preliminary changes in conceptual understanding and creative-product scores occur after implementation? Contemporary constructivist approaches frame learning as an active process mediated by language, tools, social interaction, facilitation, and learner participation (Edy et al., 2025; Saepudin et al., 2024; Yuliani et al., 2024). In this study, PjBL operationalised these principles through project planning, peer discussion, teacher scaffolding, production, and revision. Learners did not only receive definitions. They applied concepts while negotiating the content, audience, wording, and visual design of authentic products.

Experiential learning further explains why product creation may strengthen understanding. Recent review evidence similarly emphasises learning through concrete activity, reflection, practical engagement, and the connection of experience with subsequent action (Kang et al., 2022). The advertisement, slogan, and poster sequence was therefore designed as a cycle of study, creation, feedback, and improvement. The cognitive theory of multimedia learning provides the design rationale for Google Sites. Recent multimedia-learning research indicates that coherent mental representations are better supported when relevant words and visuals are integrated, signalled, segmented, and protected from unnecessary information (Castro-Alonso et al., 2021; Çeken & Taşkın, 2022; Fyfield et al., 2022; Cavanagh & Kiersch, 2023; Mayer, 2024). Google Sites supported this process by organising short explanations, worked examples, images, and videos within accessible topic pages. The framework predicts that pedagogy and platform should interact: PjBL supplies authentic activity, while the website supplies structured representations and flexible access.

Figure 1. Conceptual logic of the intervention



As shown in Figure 1, the intervention links three theoretical foundations—social constructivism, experiential learning, and multimedia learning—with the instructional design of PjBL-based Google Sites. These foundations inform authentic project tasks and multimodal learning resources, which support inquiry, production, collaboration, feedback, and reflection. These learning processes are expected to strengthen conceptual understanding and the quality of learners’ advertisements, slogans, and posters.

METHODS

Design and Setting

The study used a Research and Development design guided by ADDIE: analysis, design, development, implementation, and evaluation (Hidayat & Nizar, 2021). ADDIE was selected because it links needs analysis, instructional design, expert review, implementation, and revision. This development logic is consistent with nonformal-education work emphasising structured planning, facilitation, implementation, and evaluation (Akhadi & Shofwan, 2024; Dumasari et al., 2024; Ridwan et al., 2024). The preliminary outcome evaluation used a one-group pretest-posttest design. It should therefore be interpreted as a pilot evaluation, not as a controlled test of causal effectiveness. The pilot took place in one Grade VIII Package B class at a public SKB in Semarang Regency, Central Java, Indonesia.

Participants and Sampling

All 10 learners enrolled in the participating intact class joined the pilot; thus, the implementation used total sampling at class level. The class teacher contributed to the needs analysis, facilitated implementation, observed learning activities, and assessed projects. The small intact-class design matched the development purpose but limited statistical power and generalisability.

Development Procedure

Analysis. Interviews, classroom observation, and needs questionnaires identified difficulties in conceptual understanding, limited opportunities for creative production, irregular attendance related to work, and the need for resources that could support both face-to-face and remote learning. **Design.** Learning objectives, content, assessment tasks, and a PjBL sequence were mapped for advertisements, slogans, and posters. The website structure included an orientation page, concept pages, examples, quizzes, project instructions, submission links, and reflection activities. **Development.** Google Sites functioned as the central platform. Canva supported product creation; Microsoft Forms/365 supported tests; Wordwall supported quizzes; YouTube and e-books provided supplementary explanations; and Google Forms supported project submission. One content expert, one educational-technology expert, and one practitioner reviewed the product. Their comments informed revisions to illustrations, cognitive appropriateness, question difficulty, time allocation, and reference attribution. **Implementation.** Learners accessed the website, studied examples, discussed project requirements, produced advertisements, slogans, and posters, received feedback, and revised their work. The design combined individual access with collaborative discussion and reflection. **Evaluation.** Formative evaluation occurred through expert comments and product revision. The pilot evaluation compared conceptual-understanding and creative-product scores before and after implementation.

Instruments

The expert-validation form used a five-point scale and covered content accuracy, alignment with learning objectives, language, visual design, navigation, accessibility, and instructional suitability. Scores were converted to percentages. Values of 81%-100% were interpreted as highly feasible. Because each expertise area was represented by one validator, agreement between validators was not calculated.

Conceptual understanding was measured using a written pretest and posttest scored from 0 to 100. The test addressed identification, comparison, and application of concepts related to advertisements, slogans, and posters. The submitted research record did not include the item-level blueprint, number of items, content-validity coefficient, or reliability coefficient. The current analysis therefore treats the test scores as preliminary classroom-assessment evidence.

Creative performance was assessed from three products: an advertisement, a slogan, and a poster. The project rubric operationalised creativity through task appropriateness, originality, clarity of message, elaboration, and visual or linguistic organisation, consistent with the view that creative expression should be both original and effective (OECD, 2024). This emphasis on meaningful creative production is also consistent with recent equivalency-education work linking multimodal learning with entrepreneurial creativity (Ilyas et al., 2025). Scores were converted to a 0-100 scale. The class teacher scored all products. A second independent rater was not used; consequently, inter-rater agreement could not be estimated. This limitation requires cautious interpretation.

Ethical Considerations

The submitted manuscript did not provide verifiable information about ethical review, institutional permission, informed consent, assent for minors, or data-protection procedures. The revised tables therefore replace learner names with codes. Ethical information must be completed from the authors' records before the manuscript is resubmitted.

Data Analysis

Expert scores were summarised as percentages. Participant-level pretest and posttest data preserved in the submitted manuscript were reanalysed. Means, standard deviations, mean changes, and percentile-bootstrap 95% confidence intervals (200,000 resamples; fixed random seed) were calculated. Because the pilot involved 10 learners and included tied or non-normal change patterns, exact two-sided Wilcoxon signed-rank tests were used consistently. Effect size was reported as $r = |Z|/\sqrt{N}$ so that statistical significance was accompanied by a magnitude estimate. Conceptual improvement was also expressed as individual normalised gain, $g = (\text{posttest} - \text{pretest}) / (100 - \text{pretest})$, with the class mean used descriptively. The previous control-versus-experimental paired-samples analysis was removed because the available table contained only three valid cases and could not support a credible between-group comparison.

RESULTS AND DISCUSSION

Needs Analysis and Product Characteristics

Learners and the teacher required a resource that could be accessed beyond scheduled meetings and that linked definitions with examples and production tasks. The resulting website organised the three text types within a consistent sequence: concept explanation, multimodal example, short formative activity, project brief, submission, feedback, and reflection. This design kept Google Sites in a supporting role and positioned PjBL as the instructional process.

Table 1. Main components of the developed teaching materials

Component	Function in learning
Orientation	Objectives, navigation, schedule, and project expectations
Concept pages	Concise explanations and comparisons of advertisements, slogans, and posters
Multimedia examples	Images, videos, and worked examples that connect verbal and visual features
Formative activities	Quizzes and short checks before project production
Project workspace	Authentic briefs, Canva links, submission forms, and feedback
Reflection	Review of conceptual choices, product quality, and revision decisions

Expert Validation

The mean expert-validation score was 90.83%, which met the study's highly feasible criterion. The educational-technology score was highest, while the content expert requested revisions to examples, cognitive appropriateness, question difficulty, and source attribution. The product was revised before the classroom pilot. No separate learner- or teacher-practicality coefficient was available; therefore, the manuscript does not claim empirically established practicality.

Table 2. Expert-validation results

Validator	Score (%)	Interpretation
Content expert	86.25	Highly feasible
Educational-technology expert	96.25	Highly feasible
Practitioner	90.00	Highly feasible
Mean	90.83	Highly feasible

Conceptual Understanding

The mean conceptual-understanding score increased by 17.00 points, from 66.50 to 83.50. The bootstrap 95% confidence interval for the mean change ranged from 12.00 to 22.50 points. Nine learners improved and one learner obtained the same score. The exact Wilcoxon test indicated a statistically reliable within-group change, $W = 0$, exact $p = .004$; the corresponding asymptotic Z was -2.699 and the effect-size estimate was large, $r = .85$. The mean individual normalised gain was 0.482 ($SD = 0.208$), classified as moderate.

Table 3. Participant-level conceptual-understanding scores

Code	Pre	Post	Change	N-gain
P01	80	80	0	0.000
P02	65	80	+15	0.429
P03	55	75	+20	0.444
P04	75	90	+15	0.600
P05	65	80	+15	0.429
P06	55	90	+35	0.778
P07	75	85	+10	0.400
P08	60	80	+20	0.500
P09	70	90	+20	0.667
P10	65	85	+20	0.571
Mean	66.50	83.50	+17.00	0.482

Creative Products

Mean scores increased for all three products. Advertisement scores increased by 24.00 points, slogan scores by 34.20 points, and poster scores by 35.60 points. Exact Wilcoxon tests were statistically significant for each product (all $p = .002$), with large effect-size estimates. These results indicate consistent short-term score improvement within the pilot class. They should not be treated as definitive evidence of creativity development because one teacher applied the rubric and no comparison group was available.

Table 4. Pretest-posttest summary for conceptual understanding and creative products

Outcome	Pre M (SD)	Post M (SD)	Mean change [95% CI]	p	r
Conceptual understanding	66.50 (8.51)	83.50 (5.30)	17.00 [12.00, 22.50]	.004	.85
Advertisement	59.20 (1.40)	83.20 (3.43)	24.00 [21.80, 26.60]	.002	.89
Slogan	57.40 (2.50)	91.60 (5.15)	34.20 [31.40, 36.80]	.002	.89
Poster	58.00 (2.31)	93.60 (4.20)	35.60 [32.60, 37.80]	.002	.89

Note. $N = 10$. Confidence intervals are percentile-bootstrap intervals for the mean change. All Wilcoxon tests are two-sided. The conceptual-understanding analysis included one zero difference; creative-product differences were all positive.

DISCUSSION

The discussion integrates three related findings: the PjBL-based Google Sites materials were rated highly feasible, learners showed a substantial short-term increase in conceptual understanding, and scores for advertisements, slogans, and posters increased after implementation. Together, these results suggest that the product functioned not merely as a digital repository but as an instructional environment connecting conceptual explanations, multimodal examples, project tasks, feedback, and revision. This is important for Package B learners who need flexible access without losing opportunities for active and creative work. The findings should nevertheless be interpreted as different forms of evidence: expert validation addresses design quality, whereas pretest-posttest results indicate what changed during classroom use. A highly rated product is not automatically practical in all settings, and short-term score changes do not by themselves establish causality.

The first issue concerns the 90.83% expert-validation result. The content expert score of 86.25%, educational-technology expert score of 96.25%, and practitioner score of 90.00% indicate strong judgments across content, technology, and classroom relevance. The content expert's requests for revisions to examples, cognitive appropriateness, question difficulty, and source attribution also show that feasibility emerged through review and revision rather than simple endorsement of the first prototype. Expert review is valuable for detecting design weaknesses before implementation, but usability, accessibility, efficiency, and learner satisfaction require evidence from actual users. Systematic reviews show that educational technology can be technically functional yet still create difficulties when navigation, cognitive effort, or pedagogical integration are weak (Vlachogianni & Tselios, 2022). Evaluation is therefore stronger when pedagogical quality and usability are considered together (Estrada-Molina et al., 2022). The 90.83% score consequently supports readiness for a pilot, not proven practicality.

The second finding concerns conceptual understanding. The mean score increased by 17 points, from 66.50 to 83.50; nine of ten learners improved; and the mean individual normalised gain was 0.482. The exact Wilcoxon result ($p = .004$) and large within-group effect estimate ($r = .85$) indicate a consistent direction of change in this small class. The target concepts require learners to distinguish purpose, audience, language features, and visual-verbal relationships rather than merely recall definitions. PjBL may have supported this change by requiring learners to apply those distinctions while making real products. Meta-analytic evidence from informal project-based learning likewise reports positive learning gains, while showing that outcomes vary with assessment, group size, duration, and instructional design (Santhosh et al., 2023). The most defensible interpretation is therefore that conceptual knowledge was repeatedly activated through explanation, production, feedback, and revision not that Google Sites alone raised scores.

Multimedia learning offers a more specific mechanism for the conceptual change. Google Sites organised short explanations, images, video, quizzes, and worked examples within topic pages, allowing learners to revisit material beyond scheduled meetings. This structure may have reduced unnecessary searching and supported integration of verbal and visual information. A systematic review found that instructional video can improve learning when it is meaningfully integrated with instruction rather than used as passive exposure (Noetel et al., 2021). Experimental evidence also shows that segmentation in multimedia environments can influence cognitive load, retention, vocabulary learning, and reading comprehension (Liu, 2024). These findings make the website's sequence of concise explanations, examples, checks, and project briefs theoretically plausible. However, the study did not directly measure cognitive load, navigation behaviour, or time-on-task, so this mechanism remains an evidence-informed interpretation rather than a demonstrated process.

The creative-product results require genre-specific interpretation. Advertisement scores increased by 24.00 points, from 59.20 to 83.20. Producing an advertisement requires learners to coordinate audience, persuasive purpose, wording, information selection, and visual presentation. Creativity is therefore constrained by communicative effectiveness: originality is insufficient if the message is unclear or mismatched to its audience. Research on project-based writing shows that PjBL can strengthen writing performance by engaging learners in planning, production, feedback, and revision around meaningful outputs (Arochman et al., 2024). Digital multimodal composing likewise enables learners to express ideas through coordinated linguistic and visual modes while encouraging revision and attention to audience (Zhang & Yu, 2023). These mechanisms fit the advertisement task, but the result should still be described as improvement in rubric-rated product performance rather than proof of a general increase in creativity.

The larger changes for slogans and posters may reflect different task affordances. Slogan scores increased by 34.20 points, from 57.40 to 91.60. A slogan imposes strong constraints because learners must compress meaning into a short, memorable expression while maintaining clarity and persuasive force. Poster scores increased by 35.60 points, from 58.00 to 93.60, the largest change among the three products. Posters provide a broader multimodal space in which text, image, hierarchy, spacing, and audience appeal must be coordinated. Studies of digital multimodal composing report that infographic-style tasks can foster creativity, autonomy, and information-literacy practices because learners must select and combine several representational modes (Pham & Li, 2023). Research on instructional-video creation similarly shows that multimodal composing requires learners to orchestrate semiotic resources for an audience (Ho, 2022). These studies help explain the pattern, although the single-rater design prevents firm conclusions about task-specific creativity.

Across the three outcomes, the strongest explanation comes from integrating PjBL, constructivism, experiential learning, and multimedia learning. Constructivism explains active interpretation, discussion, and guided knowledge construction. Experiential learning explains the cycle of creating a product, receiving feedback, reflecting, and revising. PjBL organises these processes around an authentic output, while multimedia learning concerns how information is represented and sequenced. In this design, Google Sites structured access to content, whereas PjBL converted that content into purposeful action. Recent constructivist work in nonformal education likewise emphasizes participation, contextual meaning, and facilitated knowledge construction (Edy et al., 2025), while project-oriented digital learning in equivalency education shows the value of combining technology with collaborative production rather than treating digital literacy as isolated technical training (Sari et al., 2024). This integrated explanation is more defensible than attributing all gains to a single platform or method.

The study also contributes to nonformal and equivalency education through the idea of structured flexibility. Package B learners may combine study with employment and other responsibilities, so flexible access must still preserve interaction, feedback, and productive work. The website allowed explanations and project instructions to remain available for repeated access, while the project cycle maintained production and revision. This combination is compatible with evidence that nonformal programmes need to align learning with practical competencies, digital demands, facilitation, and learners' participation conditions (Suminar et al., 2024). It also complements research on online equivalency education showing that digital provision becomes more meaningful when it supports transformative learning rather than simply transferring conventional materials online (Saripah et al., 2025). The practical value of the product therefore lies in continuity between face-to-face guidance, independent access, and authentic project work. This emphasis is also consistent with evidence that nonformal education can have lasting effects when learning remains relevant and sustained (Simac et al., 2021), and with lifelong-learning approaches connecting community education with local capability (Prasetyo & Kusumawardani, 2025).

Alternative explanations remain important. The one-group pretest-posttest design cannot rule out repeated-testing effects, maturation, increased familiarity with teacher expectations, practice with the rubric, or novelty effects. Because the class teacher also scored all creative products, rater expectancy may have contributed to the observed changes. The small sample further means that effect estimates may be unstable. Exact Wilcoxon results show that improvement was consistent within this group, but statistical significance does not remove design limitations, and large effect-size estimates should not be treated as population effects. The findings are therefore best described as preliminary short-term within-group improvement that justifies stronger evaluation. This cautious framing keeps the discussion aligned with the abstract and conclusion and avoids turning a development pilot into a causal effectiveness study.

For tutors and SKB managers, several implications follow. Digital materials should begin with learner needs and organise content around meaningful problems and products rather than around platform features. Tutors should provide explicit early scaffolding examples, criteria, navigation support, and manageable milestones then gradually transfer decisions to learners. Creative products should be assessed with transparent rubrics and, where feasible, independent raters or moderation. Managers should anticipate unequal devices, connectivity, and digital confidence through shared access, downloadable alternatives, and face-to-face support. Need-based planning is emphasised in community-learning research (Purnomo et al., 2024), while multimodal learning in equality education shows that technology can support creativity and productive competencies when the instructional model is deliberately designed (Ilyas et al., 2025). Future studies should test usability, validate instruments, document implementation fidelity, use independent raters and comparison groups, examine retention, and replicate the product across multiple SKB and PKBM settings. Practice-oriented community programmes likewise show the value of connecting digital or entrepreneurial learning with concrete community tasks (Widodo et al., 2024) and (Solfema et al., 2025).

LIMITATIONS

The study has several limitations. First, the pilot involved only 10 learners from one intact class at one SKB. Second, the absence of a valid comparison group prevents causal conclusions and leaves the findings open to maturation, repeated-testing, teacher, and novelty effects. Third, the intervention duration and implementation fidelity were not documented in the submitted record. Fourth, item-level validity and reliability evidence for the conceptual test was unavailable. Fifth, one teacher scored the creative products, so rater effects cannot be separated from learner change. Sixth, the study did not measure retention, learner usability, technology access, or longer-term transfer. These limitations restrict generalisation to similar Package B settings and position the results as preliminary evidence for further testing.

CONCLUSION

The study developed PjBL-based Google Sites teaching materials for advertisements, slogans, and posters in Grade VIII Package B. Expert review indicated high product feasibility. Reanalysis of the available participant-level data showed moderate normalised gain and statistically reliable short-term increases in conceptual-understanding and creative-product scores. The findings support continued refinement and a larger evaluation, but they do not establish broad or causal effectiveness. Future research should document ethics and implementation fully, validate the instruments, use independent raters, assess usability and accessibility, include a well-matched comparison group, and examine retention across multiple nonformal education settings.

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