

Development of a Project-Based Assessment Instrument for Critical Thinking and Patriotism Values in Elementary Schools

Muhamad Rifai*

Universitas Negeri Yogyakarta

Jl. Colombo No.1, Karang Malang, Caturtunggal, Kec. Depok, Kabupaten Sleman,
Daerah Istimewa Yogyakarta 55281

E-mail: rifai12345678a@gmail.com

Ali Mustadi

Universitas Negeri Yogyakarta

Jl. Colombo No.1, Karang Malang, Caturtunggal, Kec. Depok, Kabupaten Sleman,
Daerah Istimewa Yogyakarta 55281

E-mail: ali_mustadi@uny.ac.id

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Abstract

Conventional assessment practices in elementary schools often separate cognitive evaluation from character development, thereby limiting the measurement of students' competencies in a holistic manner. This study addresses the need for an authentic assessment instrument that integrates critical thinking skills and patriotism values within Pancasila Education. The study aimed to develop a project-based assessment instrument that is feasible, practical, and effective for fifth-grade students. Using the 4D Research and Development model (Define, Design, Develop, and Disseminate), the study involved validation by content and assessment experts, practicality questionnaires administered to teachers and students, and a quasi-experimental Nonequivalent Control Group Design. The participants consisted of fifth-grade students at SD N 1 Kadipiro, divided into an experimental group (n = 28) and a control group (n = 32), with a total of 60 participants. Data were analyzed using t-tests, N-gain analysis, and

ANCOVA. The results indicated a high level of feasibility, with content expert validation reaching 90% and assessment expert validation reaching 97%. The instrument was also found to be highly practical based on user responses. ANCOVA results revealed significant differences between the experimental and control groups in terms of critical thinking skills ($F(1, 57) = 196.13, p < 0.001$) and patriotism values ($F(1, 57) = 444.44, p < 0.001$), with the experimental group demonstrating better outcomes than the control group. In conclusion, the developed project-based assessment instrument is feasible, practical, and highly effective, providing an innovative solution for implementing comprehensive and authentic assessment in elementary education.

Keywords: assessment, critical thinking, patriotism values, project-based learning

A. Introduction

Critical thinking skills and patriotism values are two fundamental competencies that should be emphasized from elementary school. Critical thinking equips students with the ability to filter information, analyze it in depth, and solve problems effectively (Ho et al., 2023). Furthermore, patriotism values fosters a sense of nationalism, cultural appreciation, and active participation in national life (Faridli et al., 2025). In the era of globalization, the synergy of these two aspects is a fundamental basis for developing a competitive young generation while remaining grounded in national values, making their development an absolute priority in the elementary school curriculum (Yulianto et al., 2023).

However, the evaluation instruments currently available in the field are still very limited. Assessment practices tend to be stuck on purely cognitive outcomes and fail to capture thought processes and the holistic internalization of affective values (Trikoili et al., 2025). The use of conventional multiple-choice tests has been shown to be incapable of stimulating students' ability to construct logical arguments (Ismail Gani et al., 2022). Meanwhile, character assessments conducted by teachers are often subjective because they are not supported by measurable and clear behavioral indicators (Maulinda, 2021). These obstacles underscore the urgent need for assessment instruments that are comprehensive, valid, and authentic.

Internationally, education systems in various countries face similar challenges, where academic achievement assessments often dominate and marginalize the development of civic dispositions (Ningsi & Shaleh, 2024). However, the global evaluation trend in Project-Based Learning has shifted toward measuring 21st-century competencies that integrate higher-order thinking skills with students' social-emotional dispositions (Mita et al., 2023). This paradox, as highlighted by Pupik Dean et al. (2023), creates clear difficulties for teachers in designing objective character assessments that simultaneously measure critical thinking skills. Consequently, the lack of standardized measurement tools capable

of synergizing these two domains has become a crucial issue in the implementation of competency-based curricula globally (Steel, 2022 ; Grad & van der Zande, 2022). This condition demands innovative instruments that not only measure students' knowledge (what they know), but are also able to evaluate their real actions (how they act) in responding to national values (Omoyibo & Odili, 2025).

To bridge this gap, this study offers novelty through the development of an integrated project-based assessment instrument to unify cognitive and dispositional measures. Unlike the separate observation sheets in previous studies that are prone to bias, this instrument introduces a 'Dual-Domain Matrix Rubric'. This matrix rubric directly aligns specific critical thinking indicators (such as problem identification and analysis of alternative solutions) with concrete patriotism indicators relevant for elementary school age (such as utilization of local resources and collaborative community problem-solving). This integrated scheme provides a single, structured, valid, and reliable measurement tool for teachers to assess how students' cognitive analysis skills are operationalized through national values.

This study aims to developed a project-based assessment instrument for Pancasila Education for fifth grade elementary school students by focusing on three main targets: producing a feasible product, testing its practicality in the classroom, and testing its effectiveness on students' critical thinking skills and patriotism values. The research hypothesis proposed that significant differences would exist significant differences in the achievement of critical thinking skills and patriotism values between students assessed using project-based assessment compared to students assessed using conventional assessment. Using the 4D model development research method (Define, Design, Develop, Disseminate), the product effectiveness test was analyzed through a quasi-experiment using a Non-equivalent Control Group Design assisted by ANCOVA analysis. Through this approach, the research is expected to be able to provide an applicable contribution for educators in transforming the quality of learning evaluation in elementary schools.

B. Research Methods

This study employed a research and development (R&D) approach with the 4D model (Define, Design, Develop, Disseminate) to produce project-based assessment instruments that measure the critical thinking skills and patriotism character of fifth-grade elementary school students. This study employed a Research and Development (R&D) approach using the 4D model (Define, Design, Develop, Disseminate) to produce a project-based assessment instrument for fifth-grade elementary school students. The Define phase was conducted through field observations and structured interviews with teachers and students at SD Negeri Kadipiro 1 to pinpoint real-world gaps in dual-domain evaluation. In the Design phase, a highly structured instrument blueprint was developed to bridge cognitive

and dispositional domains. Critical thinking skills were operationalized through Ennis's core indicators, which specifically mandate the measurement of student interpretation, analysis, evaluation, and inference during project execution. Simultaneously, the patriotism character was explicitly mapped based on national curriculum dimensions, focusing on three operational indicators: national pride, local cultural preservation, and civic responsibility in community problem-solving. To make these abstract domains measurable, they were integrated into an analytical rubric model featuring a 4-point performance matrix (ranging from Level 1 for "Emerging" to Level 4 for "Exemplary") that delineates explicit, objective behavioral criteria for each achievement level, ensuring teachers can score critical thinking and character concurrently. This initial instrument design was then subjected to rigorous content validation by a panel of subject matter experts and assessment experts.

The Develop phase was subsequently carried out through two progressive waves of testing to validate the instrument's metrics. A limited tryout involved 10 students to verify the linguistic clarity and readability of the rubric items. Following minor textual adjustments, a field trial was conducted with 60 fifth-grade students at SD Negeri Kadipiro 1, who were purposefully divided into experimental and control groups to simulate an authentic classroom implementation. To provide a thorough analysis of construct validity, a Corrected Item-Total Correlation analysis was performed using SPSS, wherein items with a correlation coefficient lower than the critical r -table value ($r < 0.254$) were systematically eliminated to ensure that every task on the rubric explicitly contributes to measuring the targeted underlying constructs. The internal consistency and overall reliability of the finalized instrument scales were verified using the Cronbach's Alpha formula, yielding coefficients well above the standard threshold ($\alpha \geq 0.70$).

Data collection throughout these trials was comprehensively executed using a combination of direct observations, teacher questionnaires, student rating scales, and paired pretest-posttest assessments. The operational effectiveness of the project-based assessment instrument was analyzed statistically using Analysis of Covariance (ANCOVA), which treated the baseline capability (pretest scores) as a covariate to control for initial differences among students, thereby ensuring an unbiased and more accurate comparison of the posttest results. This main analysis was further supported by an Independent Samples T-test and an N-Gain analysis to chart the absolute growth of student competencies. Although the current field trial was limited to a cluster sample of 60 students within a single school ecosystem due to logistical constraints during development, the final Disseminate phase was initiated on a limited scale through peer-review dissemination and focused product utilization workshops for fifth-grade elementary school teachers, proving that the tool is scalable, practical, and highly effective for competency-based educational

environments.

C. Results and Discussion

This research produced a project-based assessment instrument designed to measure the critical thinking skills and patriotism values of fifth-grade elementary school students. This instrument was developed through the stages of define, design, develop, and disseminate, involving teachers and students as the main subjects. The results of observations in schools showed that students' critical thinking skills were still low, as indicated by only about 30% of students being able to provide analytical answers, while the majority of students still gave simple answers without clear reasoning. The attitude of patriotism has also not been well internalized, as stated by teachers regarding the character assessment. Teachers also emphasized that the existing assessment instrument is only oriented towards cognitive aspects and is not able to evaluate the thinking process or internalization of character values. These findings reinforce the urgency of developing a new, more comprehensive project-based instrument equipped with an objective assessment rubric.

Based on the validation and formative evaluation by subject matter experts, several items in the instrument were revised to improve clarity and ensure readability for fifth-grade elementary students. The detailed revision matrix, showing the items before revision, expert advice, and the final revised items, is presented in Table 1.

Table 1. Project-based Assessment Product Improvement Matrix			
No	Product Before Revision	Expert Advice	After Revision

1.

Bagian II : Esai

1. Buatlah sebuah slogan atau poster sederhana yang dapat menginspirasi teman-temanmu untuk menerapkan nilai-nilai Pancasila dalam kehidupan sehari-hari. Jelaskan arti dari slogan atau poster yang kamu buat!
2. Bagaimana cara yang bisa kamu lakukan untuk menyebarkan pesan dari slogan yang telah kamu buat agar banyak orang menerapkannya dalam kehidupan sehari-hari?
3. Rancanglah sebuah kegiatan di sekolah yang dapat meningkatkan semangat gotong royong dan kebersamaan antar siswa! Jelaskan bagaimana kegiatan itu dapat mencerminkan nilai-nilai Pancasila!
4. Jika kamu menjadi ketua panitia dalam kegiatan tersebut, bagaimana cara kamu mengajak seluruh siswa agar mau berpartisipasi aktif?
5. Buatlah skenario pendek (cerita singkat) tentang seorang siswa yang menghadapi dilema moral dalam menerapkan nilai-nilai Pancasila. Jelaskan bagaimana solusi yang mencerminkan nilai-nilai Pancasila!
6. Jelaskan bagaimana sikap yang diambil dalam cerita tersebut dapat menjadi contoh bagi siswa lain di sekolah!
7. Anda diminta untuk membuat kampanye kecil di lingkungan sekolah tentang pentingnya persatuan dalam keberagaman. Apa langkah-langkah yang akan Anda lakukan?
8. Bagaimana cara mengukur keberhasilan kampanye tersebut dalam meningkatkan kesadaran siswa tentang persatuan dalam keberagaman?
9. Bayangkan kamu menjadi ketua kelas atau pemimpin di lingkungan sekolah. Buatlah keputusan penting yang harus kamu ambil dan jelaskan bagaimana keputusan tersebut mencerminkan nilai-nilai Pancasila!
10. Apa tantangan yang mungkin kamu hadapi dalam mengambil keputusan tersebut, dan bagaimana cara mengatasinya?

Subject Expert

Adapt the readability of the material and project assignments to the language development of fifth-grade children. Simplify the language without changing the essence of the indicators being measured.

Bagian II : Esai

1. Buatlah satu slogan (kalimat ajakan) atau gambar poster pendek yang mengajak teman-temanmu untuk mengamalkan Pancasila setiap hari. Lalu, jelaskan apa arti dari slogan atau gambar yang kamu buat itu!
2. Bagaimana cara kamu membagikan slogan atau poster tersebut agar dibaca oleh banyak orang dan mereka mau menirunya di kehidupan sehari-hari?
3. Buatlah satu rencana acara seru di sekolah yang bisa membuat semua siswa kompak dan kompak bekerja sama (gotong royong). Jelaskan juga sila Pancasila mana saja yang ada dalam acara tersebut!
4. Jika kamu terpilih menjadi ketua panitia acara itu, bagaimana caramu menyua dan mengajak teman-teman sekolah supaya semuanya mau ikut membantu dengan semangat?
5. Buatlah cerita pendek tentang seorang siswa yang bingung memilih antara melakukan hal yang benar atau yang salah dalam mengamalkan Pancasila. Lalu, tuliskan bagaimana akhir cerita yang baik sesuai nilai Pancasila!
6. Mengapa sikap tokoh dalam ceritamu tadi penting dan bisa menjadi contoh yang baik untuk teman-teman lain di sekolah?
7. Kamu ingin membuat gerakan kecil di sekolah untuk mengajak teman-teman saling menghargai perbedaan (seperti beda suku, agama, atau hobi). Tuliskan langkah-langkah apa saja yang akan kamu lakukan!
8. Bagaimana cara kamu tahu kalau gerakan yang kamu buat itu berhasil membuat teman-teman jadi lebih rukun dan kompak?
9. Bayangkan kamu menjadi ketua kelas atau pemimpin di sekolah. Tuliskan satu keputusan penting yang harus kamu ambil, dan jelaskan mengapa keputusannya itu sudah adil sesuai Pancasila!
10. Apa kesulitan yang mungkin kamu hadapi saat mengambil keputusan tersebut, dan bagaimana caramu mengatasi kesulitan itu?

The draft content of the assessment instrument and project assignment items still was conducted vocabulary that is too abstract, and is not yet fully operational for measuring patriotism character indicators at the elementary school level.

The vocabulary and wording of the project assignment instrument have been simplified to be more concrete for fifth grade children, while maintaining the essence of the critical thinking indicator content and patriotism values values.

2.

Petunjuk Penyelesaian Proyek Kampanye Persatuan

Sebelum memulai kegiatan proyek ini, alangkah baiknya jika para siswa terlebih dahulu membentuk kelompok kecil yang beranggotakan 4 sampai 5 orang yang dipilih secara heterogen. Setelah kelompok terbentuk, masing-masing kelompok diharapkan melakukan diskusi bersama untuk menentukan topik utama kampanye yang berkaitan dengan tema persatuan dalam keberagaman di lingkungan sekolah. Siswa kemudian dapat memanfaatkan buku bacaan di perpustakaan atau mencari informasi digital di internet sebagai referensi awal untuk mengisi lembar asesmen awal mengenai pemahaman keberagaman yang telah disediakan oleh guru. Apabila pengisian asesmen awal telah diselesaikan dengan baik, barulah siswa secara bersama-sama menaungkan ide-ide kreatif mereka ke dalam bentuk poster kertas karton atau media digital, di mana pengerjaannya harus membagi tugas secara adil agar setiap anggota mengambil peran aktif hingga produk akhir tersebut selesai dan siap untuk dipresentasikan di depan kelas pada minggu berikutnya.

Expert Assessment

Simplify the command sentences in the project work step instruments to make them more operational, concise, and can be understood independently by students directly.

Silakan ikuti langkah-langkah di bawah ini secara urut:

- 1. Bentuk Kelompok:**
Langkah 1.
Berkumpulilah bersama 4 sampai 5 orang temanmu untuk membuat satu kelompok.
- 2. Isi Lembar Asesmen Awal:**
Langkah 2.
Buka dan isilah Lembar Asesmen Awal yang diberikan guru. Kamu boleh membaca buku di perpustakaan atau mencari informasi di internet untuk membantu menjawabnya.
- 3. Diskusikan Ide Kampanye:**
Langkah 3.
Ngobrol bersama kelompokmu untuk memilih satu tema tentang "Cara Menghargai Perbedaan di Sekolah".
- 4. Ragi Tugas Pembuatan Poster:**
Langkah 4.
Bagi tugas secara adil dengan teman kelompokmu. Buatlah poster bertema persatuan pada kertas karton.
- 5. Kumpulkan dan Presentasikan:**
Langkah 5.
Tunjukkan dan ceritakan hasil poster kelompokmu di depan kelas pada pertemuan minggu depan.

The structure of the project work instructions and the instructions for filling out the initial assessment are arranged in the form of descriptive paragraphs that are too long, so they have the potential to confuse the student when reading the instructions.

The format of the technical instructions for project implementation was changed from paragraph form to sequential work instruction points (1, 2, 3), so that the assignment flow became much more operational and easier for students to follow.

3.	3. Rancanglah sebuah kegiatan di sekolah yang sekiranya dapat meningkatkan semangat gotong royong dan kebersamaan antar siswa yang berbeda latar belakang, serta jelaskan secara komprehensif bagaimana kegiatan yang kamu rancang tersebut dapat secara nyata mencerminkan nilai-nilai yang terkandung dalam Pancasila! 5. Buatlah sebuah skenario pendek atau cerita singkat mengenai seorang siswa yang sedang menghadapi situasi dilema moral dalam upaya menegakkan nilai-nilai Pancasila di kehidupan sehari-hari, kemudian jabarkan bagaimana solusi terbaik yang harus diambil oleh siswa tersebut agar tetap mencerminkan nilai-nilai luhur Pancasila! 7. Apabila Anda diminta untuk mengompilasi sebuah kampanye berskala kecil di lingkungan sekolah mengenai pentingnya menjaga persatuan di tengah-tengah keberagaman yang ada, jabarkan langkah-langkah strategis apa saja yang akan Anda lakukan guna merealisasikan kampanye tersebut!	Class Teacher V The specific language in essay questions 3, 5, and 7 needs to be simplified further to make them more straightforward and in line with students' actual reading comprehension abilities in the classroom.	3. Buatlah satu rencana kegiatan seru di sekolah yang bisa mengajak teman-temanmu bekerja sama (gotong royong). Lalu, jelaskan sila Pancasila mana saja yang ditunjukkan dalam kegiatan tersebut! 5. Buatlah cerita pendek tentang seorang siswa yang bingung memilih antara melakukan hal yang benar atau salah saat mengamalkan Pancasila. Tuliskan juga bagaimana akhir cerita yang baik sesuai nilai-nilai Pancasila! 7. Kamu ingin membuat gerakan/kampanye kecil di sekolah untuk mengajak teman-teman saling menghargai perbedaan (suku, agama, atau hobi). Tuliskan langkah-langkah apa saja yang akan kamu lakukan! The sentence structure in essay questions 3, 5, and 7 has been improved by trimming convoluted clauses into direct sentences that focus on the essence of the question, making it more friendly for student readability.
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The developed instrument consisted of multiple-choice and essay question grids, an assessment rubric, the assessment instrument itself, a scoring system, and a teacher's guide. Validation by subject matter experts and evaluation experts indicated that the instrument was highly feasible for use, with a feasibility score above 90%. A limited pilot test involving 10 students and one teacher yielded positive responses regarding the clarity of the language, ease of use, flexibility, and relevance of the instrument to learning. Teachers found the instrument practical and applicable in a variety of classroom settings, while students found it engaging, easy to understand, and appropriate for their abilities. These positive responses confirmed that project-based assessment was not only content-appropriate but also practical in its implementation.

A field trial involving 60 students divided into experimental and control groups provided empirical evidence regarding the instrument's effectiveness. Descriptive analysis showed a significant increase in critical thinking (CBT) and patriotism values (CTA) scores in the experimental group compared to the control group. The results of the ANCOVA analysis supported these findings by showing a statistically significant difference after controlling for the initial (pre-test) scores, thus rejecting the null hypothesis and accepting the alternative hypothesis. Detailed ANCOVA test parameters and effect sizes based on the empirical test data are presented in Table 2.

Table 2. ANCOVA Test Results and Effect Size Values (Partial Eta Squared) for Groups

Dependent Variable	F Value	Significance (p)	Partial Eta Squared (η^2)	Effect Category
Critical Thinking Skills (BK)	196,133	<0,001	0,775	Large
Patriotism Character (CTA)	444,438	<0,001	0,886	Large

The Partial Eta Squared (η^2) coefficient values in Table 1 show very high figures. For critical thinking skills, the value of $\eta^2 = 0.775$ indicates analytically that 77.5% of the variance in students' critical thinking scores on the post-test is explained by differences in treatment between groups (project-based assessment instrument intervention). Meanwhile, for the patriotism character variable, the value of $\eta^2 = 0.886$ indicates that the intervention accounted for 88.6% of the variance to the formation of students' character after reducing the initial score bias. Referring to Cohen's criteria, these two coefficient values far exceed the threshold for a large effect (>0.14), which confirms that this instrument has very strong practical significance in improving the quality of learning and evaluation in the classroom.

The quantitative findings above strengthen and synthesize previous literature thematically to avoid overlap. In the cognitive domain, this remarkable improvement in critical thinking aligns with studies by Yufriзал (2021) and Maryani et al. (2021), who found that problem-solving in projects stimulates students' analytical skills. From an evaluation perspective, the instrument's success in capturing affective outcomes supports the arguments of Antony et al. (2024), and Sari et al. (2024), regarding the validity of authentic rubrics in minimizing subjective teacher assessment bias. Furthermore, this study expands the conceptualization of character previously outlined by Park & Hong (2025). The character of patriotism in this study is not defined narrowly or chauvinistically, but rather oriented toward the concept of constructive patriotism. In the context of Pancasila Education, the constructive patriotism of fifth-grade elementary school students is operationally manifested when they are able to identify environmental problems, appreciate diverse opinions during group work, and offer concrete solutions. This bridges Thomas Lickona's theory of moral development, where the instrument successfully records the transition from moral knowing to real moral action objectively.

The implication of this research is that teachers can use project-based assessment instruments to evaluate critical thinking processes and patriotism values more comprehensively, thereby making Pancasila Education learning more meaningful and relevant to students' needs. This instrument can also serve as an alternative authentic assessment that supports the Independent Curriculum because it emphasizes active student involvement in real-life projects that integrate

cognitive and affective aspects. However, this research is still limited to the scope of one school and one grade level, so the generalizability of the results is still limited. Further research is needed with a broader scope, involving various schools and educational levels. Furthermore, future research can explore the integration of project-based assessment with digital approaches (e-PjBL) to expand access and improve assessment efficiency. Overall, the developed instrument has proven valid, reliable, practical, and effective. These findings provide a significant contribution to the development of authentic assessment in elementary schools, while strengthening the literature that project-based assessment can be a solution to the limitations of traditional assessments that focus only on final results. In conclusion, this research leads us to a new understanding that assessment not only functions as a cognitive measuring tool but also as a means of forming national character through meaningful learning experiences.

Overall, this study answers the research questions regarding the feasibility, practicality, and effectiveness of project-based assessment instruments. The developed instrument has been proven to be valid, reliable, practical, and effective in improving critical thinking skills as well as the patriotism values of elementary school students. These findings provide a tangible contribution to the development of authentic assessment in elementary schools, while also strengthening the literature that project-based assessment can be a solution to the limitations of traditional assessments that only focus on final results. Thus, this study guides readers toward a new understanding, that assessment not only functions as a cognitive measurement tool but also as a means of shaping national character through meaningful learning experiences.

D. Conclusion

This study demonstrated that an integrated project-based assessment instrument can simultaneously measure students' cognitive and dispositional development in elementary education. The developed instrument was found to be valid, reliable, practical, and effective in assessing critical thinking skills and patriotic character among fifth-grade elementary school students. By integrating Ennis's critical thinking indicators with observable civic behaviors, the instrument provides a more authentic approach to evaluating students' competencies beyond conventional academic assessments. The practical implications of this study are particularly relevant to the implementation of competency-based learning frameworks, including the Kurikulum Merdeka. The integrated assessment instrument enables teachers to assess cognitive and character dimensions within a single framework, thereby facilitating a more efficient and objective evaluation process. In addition, the instrument may serve as an alternative assessment tool for supporting the implementation of the Pancasila Student Profile in elementary

schools. Overall, this study contributes to the development of authentic assessment practices and provides empirical support for the integration of cognitive and character dimensions in elementary school assessment.

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F. Author Contribution Statement

MR was responsible for field data collection, data analysis, and drafting the initial manuscript. AM contributed in research supervision, methodology development, as well as review and editing of the final manuscript. The authors have read and approved the final manuscripts to be published.

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