

Picture Guessing in Cultural Diversity Learning: An Exploratory Two-Class Study of Fourth-Grade Students' Situational Interest and Understanding

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Abstract

Background - Cultural diversity in elementary civic education is often reduced to memorizing cultural objects. A structured picture-guessing routine may create a more active entry into the topic while requiring little technology.

Purpose - This study explored the differences in situational interest and conceptual understanding observed between two intact fourth-grade classes receiving picture-guessing instruction and conventional instruction.

Method/Approach - A nonequivalent pretest-posttest quasi-experimental design involved 46 students from two intact classes at one elementary madrasah in Central Java. One class received a five-part routine of noticing, guessing, justifying, comparing, and consolidating; the other received regular teacher-led instruction. Understanding was measured with a 35-item multiple-choice test, and situational interest was measured with a five-point questionnaire. Because only one classroom represented each condition, the analysis was descriptive and exploratory. It reported group means, raw gains, observed mean differences, and Hedges' *g* without population-level significance tests.

Findings - The picture-guessing class recorded a higher posttest mean for understanding than the comparison class (73.78 vs. 59.04; observed difference = 14.74; descriptive *g* = 0.64). It also recorded higher situational interest (73.43 vs. 61.48; observed difference = 11.95; descriptive *g* = 1.21). These differences describe this two-class comparison and cannot separate the instructional condition from pre-existing classroom effects.

Conclusion - The findings provide preliminary evidence consistent with the potential usefulness of picture guessing for cultural-diversity learning. Replication across several schools and classrooms is required before effectiveness or generalizability can be established.

Novelty/Originality/Value - The study examines cognitive and affective outcomes together in an elementary madrasah and evaluates a reusable visual routine that does not depend on digital equipment.

Keywords: conceptual understanding; cultural diversity; elementary civic education; picture guessing; situational interest

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INTRODUCTION

Learning about cultural diversity is more than naming traditional houses, clothing, dances, or musical instruments. In elementary civic education, cultural examples should help children recognize equal dignity, understand difference, and participate in a plural society. Banks (2008) places identity, diversity, and democratic citizenship at the center of this educational task. Indonesian civic education similarly aims to move learning beyond symbolic recall toward democratic dispositions and participation (Fitra & Witanto, 2024).

Fourth-grade learners face a practical difficulty: many cultural examples are geographically distant from their experience. Teacher explanation and textbook reading can therefore turn diversity into a detached catalogue. Culturally sustaining pedagogy offers a contextual safeguard. Cultural representations should be accurate, plural, connected to learners' knowledge, and discussed without treating one object as a complete representation of a community (Paris, 2012). Recent measurement research in PK-12 settings also shows that culturally responsive practice must be demonstrated through observable classroom decisions rather than claimed from materials alone (Franco et al., 2024).

The present study uses two primary learning mechanisms. The first is active and constructive processing. Under the ICAP framework, learners engage more deeply when they generate an explanation and compare ideas than when they only receive information (Chi & Wylie, 2014). Pictures can support this process when they direct attention to relevant features and remain integrated with explanation. Contemporary synthesis of multimedia research confirms that design quality, signaling, and active processing matter more than the mere presence of visual material (Mayer, 2021; Noetel et al., 2022).

Recent work in nonformal education also emphasizes the integration of learning activities, communication, and media. Sari et al. (2024) developed a TPACK-based team-based project learning module to improve digital literacy, situating problem solving and communication within an active learning design. Although their study used a different population and technological setting, it supports examining how media function within a structured instructional activity rather than treating their presence as sufficient evidence of learning.

The second mechanism is situational interest. A partly unresolved image can create curiosity, invite a prediction, and give students a low-risk reason to participate. Hidi and Renninger's (2006) four-phase model remains the foundational account of how triggered interest may develop, while a recent scoping review identifies novelty, challenge, social interaction, and meaningful content as recurring sources of situational interest (Guo & Fryer, 2025). Evidence from guided-play research also indicates that play is most educationally useful when learner choice is combined with an explicit learning goal and adult guidance (Skene et al., 2022). Accordingly, picture guessing is treated here as a guided instructional routine, not as a broad pedagogy or proof that pictures alone improve learning.

Indonesian studies provide relevant local precedents. Visual and illustrated materials have supported elementary learning (Marta et al., 2021; Swari & Sujana, 2023; Wasito et al., 2022). Digital cultural flipbooks, pop-up books, and interactive civic materials have also been developed to strengthen understanding of cultural diversity, tolerance, and Pancasila values (Julian & Miaz, 2024; Nugraheni et al., 2025; Oktovian et al., 2026; Rofiah et al., 2024). Playful civic-education activities have reported promising learning outcomes (Suprianto et al., 2024). Most of this work, however, emphasizes product development, feasibility, or one outcome rather than a controlled comparison of understanding and situational interest.

Table 1. Position of the present study within selected evidence

Source	Evidence and context	Limitation relative to this study
Noetel et al. (2022)	Overview of multimedia-design reviews	Broad multimedia evidence; not a printed cultural-picture routine
Skene et al. (2022)	Systematic review and meta-analysis of guided play with children	Younger age range and varied learning domains
Franco et al. (2024)	Systematic review of culturally responsive practice measures in PK-12	Focuses on measurement rather than a cultural-diversity intervention
Nugraheni et al. (2025)	Digital cultural flipbook for diversity and tolerance	Development study and digital medium
Suprianto et al. (2024)	Game-supported civic education in elementary school	Focuses on learning outcomes rather than concurrent situational interest
Present study	Printed picture-guessing routine in two intact madrasah classes	Exploratory design with only one class per condition

Note. The matrix identifies differences in design and scope; it does not imply that the cited studies are directly comparable in effect size.

The instructional routine in this study comprised five actions: notice, guess, justify, compare, and consolidate. A culturally recognizable image focused attention; an unanswered prompt invited prediction; justification required students to identify evidence; peer comparison exposed alternative reasoning; and teacher consolidation connected the example to regional context and the civic meaning of unity in diversity. These mechanisms were proposed rather than directly measured. The intervention should therefore be interpreted as a multicomponent package of images, questioning, discussion, and feedback.

This study addressed two questions: (1) What difference in cultural-diversity understanding was observed between the picture-guessing class and the comparison class after instruction? (2) What difference in situational interest was observed between the two classes? The study contributes a preliminary two-class comparison and a low-technology routine that teachers can reproduce. It does not claim to establish a population-level causal effect.

METHODS

Research Design

The study used a quantitative nonequivalent pretest-posttest quasi-experimental design. Two existing fourth-grade classes were retained. Both classes completed measures of cultural-diversity understanding and situational interest before and after the instructional unit. One class received picture-guessing instruction, while the other received the school's regular teacher-led instruction. The class was the unit of allocation, but students were the unit of measurement. Because only one intact classroom represented each condition, classroom characteristics and instructional condition were completely confounded. The design can describe differences between these two classes, but it cannot provide a valid population-level test of the intervention effect. The study is therefore reported as an exploratory classroom comparison.

Participants and Context

Participants were 46 fourth-grade students at MI Muhammadiyah Bentak in Sidoharjo, Sragen, Central Java, during the 2026 school year. One intact class formed the picture-guessing group ($n = 23$),

and the other formed the comparison group ($n = 23$). Cultural diversity formed part of the Pancasila and Civic Education curriculum taught at this grade level. All students completed the pretest and posttest measures. The analysis did not use age, gender, prior achievement, class-formation process, teacher assignment, or earlier instructional history to establish group equivalence. The pretest provides a limited description of initial scores, but it cannot rule out unmeasured differences between the classes.

Intervention and Comparison Conditions

The picture-guessing class used printed images of Indonesian traditional clothing, houses, dances, and musical instruments. For each image, students first noticed visible features, proposed a guess, justified the guess with evidence, compared their reasoning with peers, and received teacher consolidation. The teacher confirmed or corrected the answer, located the example within Indonesia's cultural context, and linked it to unity in diversity. Incorrect guesses were treated as evidence to discuss rather than as grounds for public penalty.

The comparison class studied the same curriculum topic through teacher explanation, textbook activities, questions, and feedback without the structured picture-guessing cycle. Both classes completed the measures at comparable points. The control condition was not matched for novelty, speaking opportunities, teacher attention, or level of cognitive interaction. The observed contrast therefore represents the complete instructional package rather than the isolated contribution of pictures.

The intervention covered one cultural-diversity unit within the regular timetable. Exact lesson duration, number of sessions, number of images, grouping pattern for every activity, and number of guessing cycles were not included in the analysis. No independent fidelity checklist or second-rater observation was administered. These omissions restrict replication and prevent analysis of which component produced the observed difference.

Table 2. Planned instructional contrast between the two classes

Dimension	Picture-guessing class	Comparison class
Core content	Indonesian cultural diversity	Indonesian cultural diversity
Primary stimulus	Sequenced printed cultural images	Teacher explanation and textbook
Student response	Notice, guess, justify, compare, and discuss	Listen, read, and answer questions
Feedback	Immediate correction and cultural contextualization	Teacher correction and explanation
Technology demand	Reusable printed pictures	Existing classroom materials

Note. The table describes the planned contrast and does not constitute an implementation-fidelity score.

Image Selection and Cultural Safeguards

Cultural representations were used as prompts for interpretation rather than as complete depictions of a region or community. Teacher consolidation supplied regional context and emphasized variation within cultural groups. However, the study did not document separate review by cultural experts, systematic image-validation criteria, or consultation with represented communities. Cultural accuracy should therefore be treated as a procedural intention that requires stronger verification in future implementation.

Instruments

Cultural-diversity understanding was measured with a 35-item multiple-choice test covering recognition and interpretation of cultural examples. The label conceptual understanding is used cautiously because selected-response items may also capture recognition and factual discrimination. A

test blueprint, sample items, and cognitive-level classification are needed to demonstrate that the measure extends beyond recall.

Situational interest was measured immediately after instruction with a five-point Likert questionnaire covering attraction to the lesson, attention, active involvement, and motivation to continue learning. The term situational interest is used because the instrument captured a response to the instructional unit rather than a stable personal disposition.

The instruments were reportedly screened through item-total analysis. KR-20 was planned for the understanding test and Cronbach's alpha for the interest questionnaire, using .70 as the decision criterion. The current report does not provide the actual coefficients, validation-sample size, number of retained items, item difficulty, item discrimination, or item-level validity results. Measurement evidence therefore remains incomplete and requires author verification before publication.

Data Analysis

Means and standard deviations were calculated for each group and occasion. Raw gains were computed as the posttest mean minus the pretest mean. Observed posttest mean differences were accompanied by Hedges' *g* calculated from the pooled student-level standard deviation with a small-sample correction. In this report, *g* is a descriptive standardized difference for the two observed classes rather than an estimate of a general intervention effect. Student-level *t* tests, *p* values, and confidence intervals were not used for inference because the 46 students were nested within only two classrooms. Treating all students as independent experimental units would understate uncertainty, while a cluster-level analysis is not estimable with one classroom per condition. The analysis therefore answers the research questions descriptively and does not claim statistical significance.

Ethical Considerations

The school granted permission for the classroom study. Instruction remained within the scheduled curriculum, results were summarized at group level, and the manuscript reports no student names or direct identifiers. Because the participants were children, the authors must confirm the procedures for parental consent, child assent, confidentiality, and institutional ethical review before publication.

RESULTS AND DISCUSSION

Baseline Scores and Descriptive Change

Before instruction, the two classes had similar observed means. The picture-guessing class scored 1.08 points lower in understanding and 1.47 points higher in situational interest than the comparison class. These small baseline differences do not establish equivalence because one classroom represented each condition and other class characteristics were not measured. Both classes improved after instruction, but the picture-guessing class recorded larger raw gains. Its mean understanding gain was 19.56 points, compared with 3.74 points in the comparison class. Its situational-interest gain was 17.26 points, compared with 6.78 points in the comparison class. Table 3 presents the descriptive results.

Table 3. Pretest, posttest, and observed differences by outcome and group

Outcome	Group	Pretest M (SD)	Posttest M (SD)	Raw gain	Posttest difference	Descriptive <i>g</i>
Understanding	Comparison	55.30 (23.88)	59.04 (24.85)	3.74	-	-
Understanding	Picture guessing	54.22 (25.14)	73.78 (19.95)	19.56	14.74	0.64

Outcome	Group	Pretest M (SD)	Posttest M (SD)	Raw gain	Posttest difference	Descriptive g
Situational interest	Comparison	54.70 (9.87)	61.48 (9.21)	6.78	-	-
Situational interest	Picture guessing	56.17 (9.38)	73.43 (10.16)	17.26	11.95	1.21

Note. Each class included 23 students. Posttest differences favor the picture-guessing class. Hedges' *g* is descriptive because classroom and condition effects cannot be separated.

Cultural-Diversity Understanding

At posttest, the picture-guessing class obtained a mean understanding score of 73.78 (SD = 19.95), while the comparison class obtained 59.04 (SD = 24.85). The observed difference was 14.74 points, with a descriptive standardized difference of $g = 0.64$. This value describes a moderate-to-large separation between the two classes, but it is not a population-level causal estimate. The pattern is consistent with active and constructive processing. Students did not merely view pictures. They identified visual clues, generated an answer, explained their reasoning, compared interpretations, and received corrective feedback. This sequence corresponds to the ICAP distinction between passive reception and learner-generated processing (Chi & Wylie, 2014). It is also consistent with multimedia evidence showing that visual material supports learning when it directs attention and remains integrated with explanation and task demands (Mayer, 2021; Noetel et al., 2022).

The result extends local media-development work by examining a reusable routine in ordinary instruction. Cultural flipbooks, illustrated Pancasila materials, and visual media have reported feasibility or learning benefits (Nugraheni et al., 2025; Rofiah et al., 2024; Wasito et al., 2022). In the present comparison, the visual representation was combined with prediction, peer response, and teacher consolidation. The outcome therefore belongs to this multicomponent package, not to pictures alone.

Situational Interest

The picture-guessing class obtained a posttest situational-interest mean of 73.43 (SD = 10.16), compared with 61.48 (SD = 9.21) in the comparison class. The observed difference was 11.95 points, with a descriptive standardized difference of $g = 1.21$. The large separation warrants attention, but it describes an immediate response within one unit and two classrooms. An unresolved picture can create a manageable information gap and invite low-risk participation. Guessing gives students an initial response, justification adds cognitive work, and immediate feedback clarifies the answer. These features resemble the sources of situational interest identified by Guo and Fryer (2025). They also match guided-play evidence emphasizing an explicit learning goal, learner agency, and adult guidance (Skene et al., 2022).

The interest score should not be interpreted as enduring personal interest in civic education. Novelty, teacher enthusiasm, peer climate, and the opportunity to speak may have influenced responses. The questionnaire was administered close to the intervention and relied on self-report. The result therefore indicates situational interest associated with the classroom experience, not a stable change in motivation.

Alternative Explanations and Cultural Boundaries

The classes may have differed in prior familiarity with cultural examples, classroom climate, teacher interaction, or other unmeasured characteristics. The comparison condition also offered fewer structured opportunities to speak and justify answers. Consequently, the study may partly compare high-interaction instruction with conventional instruction. A future dismantling design could compare pictures only, pictures plus guessing, and the complete notice-guess-justify-compare-consolidate routine.

Cultural images require careful contextualization. An ambiguous or stereotypical picture can

produce confident misconceptions, and one costume or house should not be treated as representing every person in a region. The teacher should identify the source and context of each image, acknowledge variation, invite relevant family or community knowledge, and connect recognition with respect and civic participation. These practices are consistent with culturally sustaining pedagogy (Paris, 2012), but the present study did not measure their fidelity.

Practical and Theoretical Implications

For elementary madrasah classrooms, picture guessing offers a low-technology way to open discussion of unfamiliar cultural examples. Teachers can use a small set of accurate images and ask three progressive questions: What do you notice? What evidence supports your guess? What does this example teach about living with difference? Quiet pair discussion and rotating first responses can distribute participation more evenly.

The findings are consistent with two mechanisms rather than proof of them. ICAP explains why explanation and comparison may generate deeper processing than viewing alone, while interest theory explains how uncertainty, agency, and feedback may trigger attention. Culturally sustaining pedagogy defines the ethical and contextual conditions under which cultural images should be selected and discussed. Process observations are needed to test these mechanisms directly.

The combination of images, spoken justification, and peer discussion also has a multimodal dimension. Ilyas et al. (2025) examined multimodal technopreneurship learning in equality education and described interactive learning opportunities that supported participation, communication, and creative expression. Their study provides a related design perspective for combining modes of expression. It does not establish the effectiveness of picture guessing in elementary civic education; that interpretation requires evidence from the present context and stronger classroom replication.

Limitations and Future Research

The most important limitation is the use of only one classroom per condition. Treatment and classroom effects cannot be separated, so student-level *p* values and confidence intervals would not provide defensible population inference. The descriptive differences may reflect the intervention, pre-existing class characteristics, teacher effects, or their combination. Further limitations include one school, 46 students, nonrandom allocation, immediate posttests, self-reported situational interest, no delayed retention measure, incomplete instrument coefficients, no fidelity checklist, and incomplete documentation of intervention dosage and cultural-image validation. Replication should include several classrooms per condition, baseline-adjusted analysis, complete psychometric reporting, independent fidelity observation, delayed testing, and systematic review of cultural representations.

CONCLUSION

In this exploratory comparison, the picture-guessing class recorded higher post-test understanding and situational interest than the comparison class. The observed posttest differences were 14.74 points for understanding (descriptive *g* = 0.64) and 11.95 points for situational interest (descriptive *g* = 1.21). These results provide preliminary evidence consistent with the potential usefulness of a routine that asks students to notice, guess, justify, compare, and consolidate culturally meaningful images. The design does not establish effectiveness because only one classroom represents each condition. Wider studies should include several classes, valid cluster-aware analyses, complete measurement evidence, implementation-fidelity checks, and delayed outcomes. Until then, the routine should be viewed as a promising classroom practice that requires further evaluation rather than a proven causal intervention.

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