

Development of Traditional Bentengan Sports as a Local Culture-Based Physical Education Media in Indonesia

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Abstract. This study aimed to develop and evaluate the feasibility, practicality, and effectiveness of Bentengan as a local culture-based Physical Education, Sports, and Health (PJOK) learning medium for elementary school students. The research used a Research and Development approach with the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation. Data were collected through observation, interviews, expert validation, and teacher and student questionnaires. The product was assessed by physical education and local culture experts and implemented with fourth-grade students. Expert validation produced an average feasibility score of 92.5%, implementation reached 94.0%, and teacher and student responses averaged 92.5%. Motor-skill scores increased from an average of 72.1 in the pretest to 88.5 in the posttest, representing a 22.7% improvement. The findings indicate that Bentengan is a feasible, practical, engaging, and culturally relevant PJOK learning medium.

Keywords: learning media; physical education; traditional games; Bentengan; local culture; elementary school; ADDIE

1 Introduction

Physical Education, Sports, and Health (PJOK) in elementary schools plays an important role in developing students' motor skills, physical fitness, social competence, and character. Learning is expected to help students refine fundamental movement skills, apply movement concepts in new situations, and adapt movement strategies to different activity contexts. However, classroom implementation may still rely on conventional and repetitive activities that do not always connect learning with students' local cultural environment.

Traditional games have considerable potential as contextual learning media because they integrate physical, social, and cultural dimensions. Traditional games can stimulate motor skills and coordination while simultaneously encouraging cooperation, sportsmanship, and awareness of local identity [1, 2]. In this context, Bentengan provides a relevant activity because it involves running, chasing, defending, attacking, speed, agility, coordination, and strategy. The integration of traditional games into physical education can therefore make learning more meaningful while contributing to the preservation of local cultural heritage [3].

Preliminary needs analysis reported in the source study indicated that PJOK activities were dominated by general games such as mini-soccer and relay races, while local traditional games were rarely incorporated. Limited facilities and equipment also restricted teachers' opportunities to create varied movement activities. At the same time, increasing use of electronic devices and

sedentary lifestyles may reduce children's opportunities to engage in active play. These conditions underline the need for simple, safe, engaging, and culturally relevant learning media.

The development of Bentengan as a PJOK learning medium is intended to respond to these needs by combining movement learning with local cultural values. The product was designed to support coordination, balance, agility, teamwork, and active participation while remaining practical for elementary school settings. The study aimed to develop the product systematically using the ADDIE model and to evaluate its feasibility, implementation, user responses, and changes in students' motor-skill performance [4].

2 Research Methods

2.1 Research Type and Design

This study employed a Research and Development (R&D) approach using the ADDIE development model, consisting of Analysis, Design, Development, Implementation, and Evaluation. The model was selected because it provides a systematic sequence for identifying learning needs, designing a product, developing and validating the product, implementing it in the field, and evaluating the resulting learning experience [4, 5].

2.2 Research Subjects and Location

The source manuscript reports that the research was conducted in an elementary school setting in Kediri Regency, East Java, involving 20 fourth-grade students consisting of 10 boys and 10 girls. Purposive sampling was used based on the consideration that the school had an active PJOK program and was open to local-culture-based innovation.

2.3 Development Procedure

The Analysis stage identified learning needs through interviews with PJOK teachers and observation of learning activities. Curriculum alignment was also examined to ensure that the characteristics of Bentengan were consistent with the intended learning outcomes.

The Design stage involved designing the game flow, rules, equipment, scoring system, learning indicators, and research instruments. The principal indicators were coordination, balance, agility, and teamwork. The instruments consisted of a student motor-skill observation sheet, teacher and student response questionnaires, and material and media expert validation sheets.

The Development stage produced a Bentengan prototype using simple materials, including two pieces of wood and raffia rope as boundary markers. The product was reviewed by two physical education experts and one local culture expert. A five-point Likert scale was used to assess product suitability. Revisions were made in response to validator recommendations, particularly regarding safety, attractiveness, and alignment with learning outcomes.

The Implementation stage involved a field trial conducted over four meetings of 2 × 35 minutes. The PJOK teacher acted as facilitator. Data were collected through implementation observations, motor-skill assessments, and student responses.

The Evaluation stage consisted of formative and summative evaluation. Formative evaluation was conducted throughout product development to improve the design and

implementation. Summative evaluation compared students' movement-skill performance before and after implementation using pretest and posttest scores.

2.4 Research Instruments

The instruments comprised an expert validation sheet for media feasibility, material suitability, local cultural values, and safety; a movement-skill observation sheet for coordination, balance, agility, and cooperation; and teacher and student response questionnaires for attractiveness and ease of use. The source manuscript reports a Cronbach's Alpha reliability coefficient of 0.87, categorized as high.

2.5 Data Analysis

Expert validation data were converted into percentages using the formula in equation (1):

$$P = (\text{Obtained Score} / \text{Maximum Score}) \times 100\% \quad (1)$$

The feasibility criteria were 81–100% = Very Feasible, 61–80% = Feasible, 41–60% = Fairly Feasible, and below 40% = Not Feasible. Effectiveness was examined by comparing pretest and posttest averages, while teacher and student responses were analyzed descriptively.

3 Results and Discussion

3.1 Expert Validation Results

Three validators assessed the Bentengan product, covering content suitability, media presentation and equipment safety, local cultural suitability and character values, and ease of implementation. The results are presented in Table 1.

Table 1. Expert validation results for the Bentengan game product.

No.	Aspect Assessed	Maximum Score	Average Score	Percentage / Category
1	Content suitability (alignment with PJOK learning outcomes)	20	18.3	91.5% – Very suitable
2	Media design and equipment safety	20	18.7	93.5% – Very suitable
3	Local culture and character values	20	18.6	93.0% – Very suitable
4	Ease of implementation by teachers	20	18.4	92.0% – Very suitable
	Total average	80	73.9	92.5% – Very suitable

The overall feasibility score was 92.5%, indicating that the developed Bentengan product was considered very suitable. The highest score was obtained for media design and equipment safety (93.5%), suggesting that the product could be adapted to an elementary school environment using relatively simple equipment.

3.2 Implementation Trial

The implementation trial was conducted with 20 fourth-grade students over four learning sessions. The average implementation rate was 94.0%, categorized as very good (Table 2). Students were reported to understand the game rules, participate actively, cooperate with peers, and follow the agreed rules.

Table 2. Level of implementation of the Bentengan game learning.

No.	Observed Aspect	Score (%)	Category
1	Understanding of game rules	91	Very Good
2	Active student involvement	94	Very Good
3	Cooperation and sportsmanship	96	Very Good
4	Overall implementation	95	Very Good
Average		94.0	Very Good

3.3 Improvement in Motor-Skill Performance

Motor-skill assessment was conducted before and after implementation. The assessed aspects were coordination, balance, agility, and teamwork. As shown in Table 3, the overall average increased from 72.1 in the pretest to 88.5 in the posttest, representing a reported improvement of 22.7%.

Table 3. Results of student motor-skill improvement.

Motor-Skill Aspect	Average Pretest	Average Posttest	Improvement (%)
Coordination	70.3	88.1	+25.3
Balance	73.2	89.0	+21.6
Agility	74.5	87.9	+18.0
Teamwork	70.4	89.1	+26.5
Total Average	72.1	88.5	+22.7

3.4 Teacher and Student Responses

The user-response questionnaire indicated positive perceptions of the product (Table 4). Ninety-five percent of students reported that the Bentengan game was enjoyable and motivating, while 92% considered it safe and easy to play. Among teachers, 90% considered the medium relevant to PJOK learning outcomes and 93% considered it easy to implement. The overall positive response was 92.5%.

Table 4. Student and teacher responses to the Bentengan game.

Respondent	Indicator	Positive (%)	Category
Students	Enjoyable and motivating	95	Very Good
Students	Safe and easy to play	92	Very Good
Teachers	Relevance to PJOK learning outcomes	90	Very Good
Teachers	Ease of implementation	93	Very Good
Overall average		92.5	Very Good

3.5 Discussion

The development results indicate that Bentengan can connect physical education with local cultural experience. Traditional games provide opportunities for students to learn movement through activities that contain recognizable social and cultural meanings. This contextual orientation is consistent with the principle that learning becomes more meaningful when it is connected to students' social and cultural environments [6].

The motor-skill results also show a positive change across coordination, balance, agility, and teamwork. Bentengan requires students to move rapidly, change direction, respond to opponents and teammates, and make movement decisions during play. These characteristics create repeated opportunities to practice fundamental movement patterns in an active and game-based context. The pattern is consistent with literature describing traditional games as useful media for developing motor and character-related competencies in elementary school students [1, 7].

The strongest reported improvement was in teamwork (26.5%), followed by coordination (25.3%). This finding is reasonable because Bentengan is a group activity in which students must communicate, cooperate, follow rules, and make decisions with teammates. Game-based physical education can therefore support not only physical development but also sportsmanship and social responsibility [8].

The implementation score of 94.0% and overall user response of 92.5% indicate that the product was accepted well in the trial setting. The simple equipment requirements and clear rules may contribute to its practicality. The development process also illustrates the usefulness of a systematic instructional design approach: needs analysis informs the design, validation identifies weaknesses, revision improves the product, and field implementation provides evidence for further evaluation [4].

The findings have implications for local-culture-based PJOK learning. Bentengan can function as an alternative learning medium that provides physical activity while introducing students to traditional play. In this way, traditional games may contribute to the preservation of local culture and the development of character values such as cooperation, responsibility, perseverance, and sportsmanship.

4 Conclusions

The development of Bentengan using the ADDIE model produced a local culture-based PJOK learning medium that was assessed as feasible, practical, and engaging in the reported field setting. Expert validation produced an average feasibility score of 92.5%, implementation reached 94.0%, and teacher and student responses averaged 92.5%. Motor-skill performance increased from an average pretest score of 72.1 to a posttest score of 88.5, corresponding to a reported 22.7% improvement. The product therefore offers an alternative game-based medium for elementary PJOK learning that integrates movement practice with local cultural values.

Further studies are recommended to involve larger samples, broader school contexts, and comparative designs across regions. Future research can also examine longer-term effects on motor development and character formation and can refine the assessment model for traditional-game-based physical education.

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