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Development of a Creative Gymnastics Model Based on the Local Wisdom of Arek Surabaya to Improvethe Physical Fitness of Junior High School Students

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Abstract

This study aims to develop an Arek Surabaya Creative Gymnastics Model as an innovative alternative for Physical Education, Sports, and Health (PJOK) learning to improve students' physical fitness while preserving local culture. This research employed a Research and Development (R&D) approach using the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation. The subjects were seventh-grade students of SMP Negeri 24 Surabaya. Data were collected through expert validation, observations, student response questionnaires, and the Indonesian Physical Fitness Test (TKJI). The developed product consists of a guidebook and instructional video integrating creative gymnastics movements with Arek Surabaya cultural characteristics. The validation results showed that the model was highly valid, with scores of 100% from material experts, 86.66% from media experts, and 95% from gymnastics practitioners. The practicality test obtained a positive student response of 94.11%. The effectiveness test showed an improvement in physical fitness, with the average score increasing from 10.71 in the pre-test to 15.37 in the post-test. The N-Gain score of 0.33 indicated a moderate improvement. These findings demonstrate that the Arek Surabaya Creative Gymnastics Model is valid, practical, and effective as an alternative for PJOK learning. Furthermore, it provides an opportunity to promote and preserve Surabaya's local cultural identity through physical education.

Keywords: *Creative Gymnastics, Physical Fitness, Physical Education, Arek Surabaya Culture, Students*

INTRODUCTION

Physical Education, Sports, and Health (PE) is an integral part of the national education system that aims to develop students holistically, covering physical, mental, social, and emotional aspects (Yulia Sari et al., 2024). Through PJOK learning, students not only improve physical fitness and motor skills, but also develop character such as discipline, sportsmanship, cooperation, responsibility, and self-confidence. Therefore, the quality of

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Physical Education (PE) learning plays an important role in supporting the achievement of educational goals holistically (Wijaya Bastian & Judijanto LosoSepriano, 2026) the basics of physical education. This is in line with the opinion of (Ward & Lehwald, 2018, p. 25) Physical Education (PE) learning emphasizes students' enjoyment in activities so that teachers need to design meaningful learning and actively involve students. Participation in physical education is also seen as part of human rights and has reached most children in the world, with around 83% of countries establishing it as a compulsory subject in schools (UNESCO, 2024). When implemented optimally, physical education has significant potential to improve individual and public health (Kirk EAH 2018).

However, in practice, problems related to students' physical fitness levels are still found. Low physical activity, sedentary lifestyles, and lack of involvement in sports activities can affect students' fitness conditions. This shows that improving physical fitness through Phsical Education(PE) learning remains a challenge in the educational process in schools. Quoting from the official website of the Deputy of the Ministry of Youth and Sports, it states that Based on the 2024 Sports Development Index, the physical fitness level of the Indonesian people was at 0.196, an increase of 0.017 points from the previous year. However, 55.5% of the population is still in the "very poor" category, while the "good" category and above only reached 6.3% (Kemenpora, 2025). Meanwhile, the Indonesian Ministry of Health released that the 2023 Indonesian Health Survey (SKI) showed that 37.4% of the population aged ≥10 years was physically inactive. The main reasons were not having time (48.7%), laziness (32.6%), old age (19.5%), and not having friends to do activities with (9.8) (BKPK, 2025).

Furthermore, problems related to low physical fitness among students due to lack of physical activity are still being identified. This situation demonstrates the crucial role schools play in encouraging physical activity through physical education (PE) learning. Physical Education (PE) provides a variety of materials that support physical fitness improvement, including gymnastics, which trains students strength, flexibility, balance, and coordination. Rhythmic gymnastics is a form of exercise performed to channel the artistic sense of movement accompanied by music or singing in accordance with the rhythm (Abdullah & Lubis, 2020). However, in practice, Physical Education learning at the junior high school (SMP) level still faces various challenges. One of the main challenges is low student motivation and active participation in learning, especially in gymnastics material.

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Based on initial observations and practical experience of physical education (PE) teachers, the gymnastics lessons implemented are still dominated by standard gymnastics with relatively similar movement patterns over time. The lack of movement variation, lack of innovation in material presentation, and limited learning media result in students being less enthusiastic about participating in the lessons. A study by (Mury Syafei, Abdulloh, et al., 2019)stated that the percentage of motivation in the medium category was 36.71%, low 18.66%, and very low 8.14%. This is important to note, as (Haris et al., 2024) states that the greater the motivation of students, the better their achievement in learning Physical Education. Therefore, efforts to increase student learning motivation in Phsical Education (PE) learning, especially in gymnastics material, are important to pay attention to.

One approach that can be taken to increase student interest is by integrating local cultural elements into learning. Local wisdom values are values inherited from the ancestors of the Indonesian nation which can still be found in traditional community culture. This traditional culture still survives in various regions of Indonesia, including the community in Surabaya (Sukmayadi, 2018). Local wisdom values have an important role in shaping cultural identity and maintaining balance, justice, and sustainability of community life (Syahroni, 2024).

Several studies that support this idea, such as from holeh et al. (2026) building a culture of healthy living and fostering pride in local wisdom, this activity successfully strengthens cooperation between schools, families, and communities, this is in line with the theory which states that learning needs to link students' culture in the learning process in the classroom by making local wisdom a learning resource. so that when students' culture is valued in learning, their motivation and learning achievement can increase (Vavrus, 2008) Integrating local culture into learning not only serves as a means of cultural preservation but can also increase the relevance of learning materials to students' daily lives.

One form of local cultural integration in Physical Education learning is through the development of creative gymnastics based on local culture. Creative gymnastics is a form of exercise designed based on creativity, combining elements of sport, movement art, and musical rhythm, resulting in a more varied and engaging series of movements. Through creative gymnastics, students can move their entire body while also learning about elements of regional culture (Tumaloto et al., 2022). Based on this description, the development of

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The Arek Surabaya Creative Gymnastics Model is an alternative innovation in physical education learning.

The development of this gymnastics model was carried out through an interactive approach.*Research and Developm ent (R& D)* in order to produce valid, practical, and effective learning products. Thus, it is hoped that the Arek Surabaya Creative Gymnastics model can be an alternative innovative Physical Eduaction learning model while being able to improve the physical fitness of students at SMP Negeri 24 Surabaya. Based on this description, the researcher is interested in conducting a study entitled "Development of the Arek Surabaya Creative Gymnastics Model to Improve Students' Physical Fitness at SMP Negeri 24 Surabaya".

METHOD

This research is a *Research and Development (R&D)* which aims to develop a PJOK learning product in the form of Senam Arek Surabaya and to test the level of feasibility, practicality, and effectiveness of the product in improving physical fitness in PJOK students at SMP Negeri 24 Surabaya. The development model used in this study is the ADDIE model, which consists of five main stages, namely*Analysis, Design, Development, Implementation,* And *Evaluation*This research was conducted at SMP Negeri 24 Surabaya. The research subjects consisted of two groups, namely expert validation subjects and product trial subjects.

1. Expert Validation Subject

Validation was conducted by several experts with expertise in physical education and learning media development. The experts involved in this study included physical education experts, gymnastics experts, material experts, and learning media experts.

2. Product Trial Subjects

The product trial subjects were seventh-grade students at SMP Negeri 24 Surabaya. The trial was conducted in two stages: a small group trial and a large group trial. The small group trial involved 10 students, while the large group trial involved 35 students. The development process of Arek Surabaya Gymnastics in this study uses the ADDIE development model.. The ADDIE model is a systematic learning development model and consists of five main stages, namely:*Analysis, Design, Development, Implementation, dan Evaluation* (Cahyadi, 2019).

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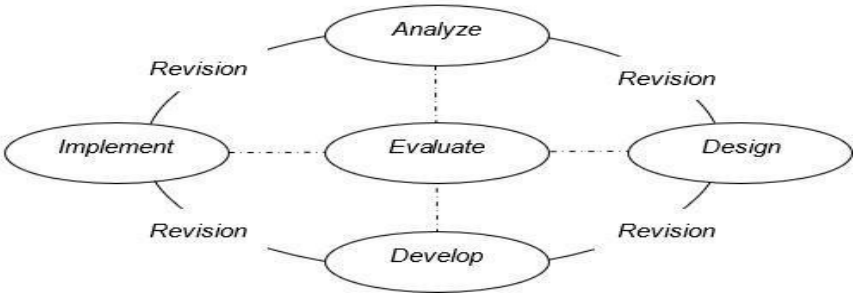


Figure 1 ADDIE Model Development Flow

The data collection techniques used in this study include observation, questionnaires, and documentation. The observation method is a data collection technique carried out through observation, accompanied by recording the condition or behavior of the target object (Hasibuan et al., 2023). According to Nana Sudjana, observation is the systematic observation and recording of the symptoms being studied. In a broad sense, observation.

In fact, it's not limited to direct or indirect observations. A questionnaire is a list of questions given to individuals willing to respond according to the user's request. The purpose of distributing a questionnaire is to obtain comprehensive information about a problem and to provide respondents with information without worrying about providing answers that don't reflect reality. The documentation method is a data collection technique used to obtain data and information in the form of documents, whether written documents,

images, or monumental works from someone (Sugiyono, 2023). Documentation technique is a method of collecting data by studying and reviewing various documents related to the focus and objectives of the research (Sanjaya W, 2015). A document is any written material or film that is not specifically prepared due to the researcher's request (Sanjaya Wina, 2015).

RESULT

1.1 Product Validation and Trial Results

The development of the Arek Surabaya Creative Gymnastics Model was evaluated through expert validation and product trials. The evaluation involved material experts, media experts, peer respondents, and students participating in small- and large-group trials. The results are presented in Table 1.

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Table 1. Results of Expert Validation and Product Trials

No		Test Subject	Presentation	Criteria Validity
1	Content Expert	1 Lecturer	100 %	Very Good
2	Media Members	1 Lecturer	86,66%	Very Good
3	Peer Respondents	1 Teacher	95,00%	Very Good
4	Small Group Trials	10 Student	92,50 %	Very Good
5	Large Group Trials	35 Student	93,36%	Very Good

The validation results indicate that the developed gymnastics model achieved very good ratings from all evaluators. The highest score was obtained from the material expert (100%), followed by peer respondents (95%), small-group trials (92.50%), large-group trials (93.36%), and media experts (86.66%). These findings indicate that the product meets the evaluation criteria and is suitable for implementation in Physical Education (PE) learning.

1.2 Pre-Test Results of Students' Physical Fitness

Before implementing the Arek Surabaya Creative Gymnastics Model, a pre-test was conducted involving 35 seventh-grade students of SMP Negeri 24 Surabaya. The Indonesian Physical Fitness Test (TKJI) was used to assess students' initial physical fitness levels through five test components: the 50-meter run, hanging body lift, 60-second sit-ups, vertical jump, and middle-distance running (800 meters for female students and 1,000 meters for male students).

Table 2. Descriptive Statistics of Pre-Test Result

No	Description	Results
1	Number of students	35
2	Total score	375
3	Mean score	10,71
4	Highest score	15
5	Lowest score	7
6	Percentage of maximum score	42, 84%
7	Average Category	poor

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Table 3. Distribution of Students' Physical Fitness Categories (Pre-Test)

No	Category	Score interval	frequency	Percentage
1	Very Good	22-25	0	0
2	good	18-21	0	0
3	Moderate	14-17	4	11,43
4	Poor	10-13	20	57,14
5	Very poor	5-9	11	31,43
6	Total		35	100

The pre-test results showed that most students were in the poor category (57.14%), followed by the very poor category (31.43%) and the moderate category (11.43%). No students were classified as good or very good. These findings indicate that students' initial physical fitness levels were relatively low before the intervention.

1.3 Post-Test Results of Students' Physical Fitness

After participating in the Arek Surabaya Creative Gymnastics program, students completed a post-test using the same TKJI instrument. The results showed a total score of 538, with a mean score of 15.37. The highest score was 19, while the lowest was 12. Compared with the pre-test mean of 10.71, the post-test mean increased by 4.66 points. The percentage of the maximum possible score also increased from 42.84% to 61.49%. These results indicate an improvement in students' physical fitness following the implementation of the developed gymnastics model.

N-Gain Analysis

The N-Gain analysis was conducted to determine the level of improvement in students' physical fitness after the intervention. The interpretation criteria were as follows:

g > 0.70 : High

0.30 ≤ g ≤ 0.70 =

Moderate g <

0.30 = Low

Table 4- N-Gain Analysis Results

No	Description	Mean
1	Pre-test mean	10,71
2	Post Test mean	15,37
3	Mean Difference	4,66
4	Maximum Score	25
5	N-Gain	0,33
6	Category	Moderate

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The N-Gain analysis produced a score of 0.33, which falls into the moderate category. This result indicates that the Arek Surabaya Creative Gymnastics Model contributed to an improvement in students' physical fitness, although the level of improvement was not yet high.

Hypothesis Testing (Paired-Samples t-Test)

A paired-samples t-test was conducted to examine whether there was a significant difference between students' physical fitness scores before and after participating in the gymnastics program.

Table 5. Paired-Samples t-Test Results

No	Description	Results
1	Number of Students	35
2	Pre-test Mean	10,71
3	Post test mean	15,37
4	Mean difference	4,66
5	Standard Deviation	0,48
6	t-count	57,21
7	t-table	2,032
8	Decision	Reject Ho
9	Conclusion	Significant

The paired-samples t-test showed a calculated t-value of 57.21, which was greater than the critical t-value of 2.032 at a significance level of 0.05 with 34 degrees of freedom. Therefore, H_0 was rejected and H_1 was accepted. These findings indicate a statistically significant difference between students' pre-test and post-test physical fitness scores.

DISCUSSION

The validation results demonstrate that the Arek Surabaya Creative Gymnastics Model achieved very good ratings from material experts, media experts, and peer respondents. The material expert awarded a score of 100%, indicating that the developed movements and learning content were considered appropriate for students' needs and learning objectives. The media expert's score of 86.66% indicates that the instructional media, including the guidebook and video, met the required presentation criteria. Meanwhile, peer respondents awarded a score of 95%, supporting the suitability of the model for PE learning. These findings suggest that the development process successfully integrated physical fitness components, age-appropriate

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movements, and local cultural characteristics into an instructional product. The integration of local culture provides meaningful learning experiences because students can connect physical activities with cultural elements familiar to their everyday lives. According to Casey and Goodyear (2015), physical education can provide meaningful learning experiences when learning activities are designed to support students' engagement and social interaction. Therefore, incorporating local cultural elements into gymnastics activities may enrich the learning experience and strengthen students' connection with their cultural environment.

The practicality assessment showed positive responses from students, with scores of 92.50% in the small-group trial and 93.36% in the large-group trial. These results indicate that students responded positively to the developed gymnastics model. The positive responses may be related to the use of creative movements, instructional videos, and a structured guidebook that help students understand and perform gymnastics activities. The use of familiar cultural characteristics also provides an opportunity for students to experience PE learning in a more contextual and engaging way. According to Bailey (2006), participation in physical education can contribute to students' physical, social, and psychological development. Thus, learning activities that encourage active participation and enjoyment are important in creating meaningful PE experiences.The practicality findings suggest that the Arek Surabaya Creative Gymnastics Model can be implemented as an alternative learning resource for rhythmic gymnastics and physical fitness activities at the junior high school level.

The pre-test results showed that most students were classified in the poor and very poor physical fitness categories. Specifically, 57.14% of students were in the poor category, while 31.43% were in the very poor category. This indicates that students' initial physical fitness levels required improvement. After participating in the Arek Surabaya Creative Gymnastics program, the average TKJI score increased from 10.71 to 15.37, representing an improvement of 4.66 points. The percentage of the maximum score increased from 42.84% to 61.49%. This improvement may be associated with students' participation in structured physical activities involving various movements that support physical fitness components, including endurance, strength, speed, and muscular power.

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According to the World Health Organization (2020), regular physical activity contributes to the development and maintenance of physical fitness in children and adolescents. Therefore, incorporating structured and enjoyable physical activities into PE learning is important for supporting students' physical development. The findings suggest that the Arek Surabaya Creative Gymnastics Model has potential as an alternative approach to increasing students' physical activity and improving their physical fitness.

The N-Gain analysis produced a score of 0.33, which belongs to the moderate category. This finding indicates that the developed gymnastics model contributed to an improvement in students' physical fitness, although the improvement had not reached the high category.The moderate improvement may be influenced by several factors, including students' initial fitness levels, individual physical abilities, consistency of participation, and the duration of the intervention. Nevertheless, the increase in the average TKJI score demonstrates that the gymnastics program provided a positive contribution to students' physical fitness. These findings support the use of creative gymnastics as an alternative physical activity in PE learning.

The paired-samples t-test indicated a statistically significant difference between the pre-test and post-test results, with a calculated t-value of 57.21, exceeding the critical value of 2.032. This result suggests that students' physical fitness scores improved significantly after participating in the Arek Surabaya Creative Gymnastics program. The findings are consistent with the descriptive results, which showed an increase in the average score from 10.71 to 15.37. However, because this study used a one-group pre-test and post-test design without a control group, the improvement should be interpreted as an increase observed following the intervention. It does not establish that the gymnastics model was the only factor responsible for the improvement.

An important feature of the Arek Surabaya Creative Gymnastics Model is the integration of local cultural characteristics into physical education activities. The developed product combines creative gymnastics movements with cultural elements representing the identity of Arek Surabaya. This approach provides an opportunity to introduce local cultural values through practical learning activities. Students not only participate in physical exercise but also become familiar with cultural characteristics associated with their local environment. The integration of local culture into PE learning

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can therefore serve two purposes: supporting students' physical fitness and providing opportunities to strengthen appreciation of local cultural identity. Overall, the findings indicate that the Arek Surabaya Creative Gymnastics Model has potential as an innovative learning alternative that combines physical fitness development with local cultural preservation.

CONCLUSION

The development of the Arek Surabaya Creative Gymnastics Model resulted in a learning product consisting of an instructional guidebook and video integrating creative gymnastics movements with local cultural characteristics. The validation results demonstrated that the product achieved very good ratings from material experts (100%), media experts (86.66%), and peer respondents (95%). Furthermore, the practicality assessment showed positive student responses in both small-group (92.50%) and large-group trials (93.36%). The effectiveness analysis showed an increase in students' average physical fitness scores from 10.71 in the pre-test to 15.37 in the post-test, with an N-Gain score of 0.33, classified as moderate. The paired-samples t-test also indicated a statistically significant difference between the pre-test and post-test results. Therefore, the Arek Surabaya Creative Gymnastics Model is considered a valid and practical learning alternative with promising results in improving students' physical fitness. In addition, the model provides an opportunity to introduce and preserve local cultural identity through Physical Education learning.

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