



Implementation of Project-Based Learning Model Based on Basic Movement Games in Physical Education Learning in Elementary Schools

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ABSTRACT

Physical education plays an important role in developing motor skills, social attitudes and student motivation. The Project-Based Learning (PBL) model is relevant because it emphasises collaborative activities, problem-solving, and meaningful learning experiences. This study employed a quasiexperimental method with a pretest-posttest control group design. The population comprised fourthgrade students at SD Negeri 12 Purwodadi, with two classes of 30 students each being selected for the experimental and control groups. The research instruments included: (1) a basic movement skills test with indicators of locomotor, non-locomotor and manipulative movements, (2) a study motivation questionnaire and (3) a student activity observation sheet. The instruments were validated through expert and limited trials. Data analysis was performed using descriptive statistics, a normality test and a homogeneity test, followed by an independent t-test. The results showed that the

experimental group achieved activity scores of 87.4% (very active) and motivation scores of 85.6% (high), which were higher than those of the control group (68.2% [moderately active] and 72.3% [moderate], respectively). This difference is statistically significant with a large effect size, thus proving that the basic motion game-based PjBL model effectively improves student engagement, motivation, collaboration and physical skills. In conclusion, the basic motion game-based PjBL model can be

409

applied in physical education learning because it develops physical skills and fosters active involvement, collaboration and motivation to learn. Further research is recommended to test this model at different school levels and in different contexts, to explore the experiences of students and teachers using a qualitative approach, and to examine the long-term impact on student attitudes and character.

Keywords: models; project-based learning; basic motion games; physical education; elementary school

ABSTRACT

Pembelajaran Pendidikan Jasmani memiliki peran penting dalam mengembangkan keterampilan motorik, sikap sosial, dan motivasi belajar siswa. Model *Project Based Learning* (PjBL) relevan diterapkan karena menekankan aktivitas kolaboratif, pemecahan masalah, dan pengalaman belajar bermakna. Penelitian menggunakan metode kuasi-eksperimen dengan desain *pretest-posttest control group*. Populasi adalah siswa kelas IV SD Negeri 12 Purwodadi, dengan sampel dua kelas masing-masing 30 siswa yang dibagi menjadi kelompok eksperimen dan kontrol. Instrumen penelitian meliputi: (1) tes keterampilan gerak dasar dengan indikator lokomotor, non-lokomotor, dan manipulatif, (2) angket motivasi belajar, serta (3) lembar observasi aktivitas siswa. Instrumen divalidasi melalui ahli dan uji coba terbatas. Analisis data dilakukan dengan statistik deskriptif, uji normalitas dan homogenitas, dilanjutkan dengan uji-t independen. Hasil penelitian menunjukkan bahwa kelompok eksperimen mencapai skor aktivitas 87,4% (sangat aktif) dan motivasi 85,6 (tinggi), lebih tinggi dibanding kelompok kontrol yang masing-masing memperoleh 68,2% (cukup aktif) dan 72,3 (sedang). Perbedaan ini signifikan secara statistik dengan ukuran efek besar, sehingga membuktikan bahwa PjBL berbasis permainan gerak dasar efektif meningkatkan keterlibatan, motivasi, kolaborasi, dan keterampilan fisik siswa. Kesimpulan, model PjBL berbasis permainan gerak dasar layak diterapkan dalam pembelajaran Pendidikan Jasmani karena tidak hanya mengembangkan aspek fisik, tetapi juga menumbuhkan keterlibatan aktif, kolaborasi, dan motivasi belajar. Penelitian selanjutnya disarankan untuk menguji model ini pada jenjang dan konteks sekolah berbeda, mengeksplorasi pengalaman siswa serta guru melalui pendekatan kualitatif, dan menelaah dampak jangka panjang terhadap sikap maupun karakter siswa.

Kata Kunci: model; *project-based learning*; permainan gerak dasar; pendidikan jasmani; sekolah dasar

INTRODUCTION

Physical Education (PE) has an important role in character formation, physical development, and improving the health of students from an early age (Veldman et al., 2020) PE learning at the elementary school level is not only aimed at improving motor skills, but also at instilling the values of sportsmanship, cooperation, and discipline (Haifa, 2020) However, in practice, PE learning is still dominated by teacher-centered approaches that limit student

410

creativity and fail to fully stimulate interest and active participation. As a result, students often show low enthusiasm, and the development of fundamental motor skills remains suboptimal.

Various studies have shown that Project-Based Learning (PjBL) is effective in improving student learning outcomes in PE, especially in terms of active engagement, collaboration, and problem-solving. A study by Agustini Raaiyatini et al., (2024) Ali et al., (2022). This study proves that PjBL can improve motor skills such as underhand passing and smash returns. Furthermore, this approach also encourages independent learning and student motivation. (Martiani, 2021), making it relevant to be applied in physical learning in elementary schools.

Previous studies have shown that project-based learning (PBL) is effective in improving various 21st-century competencies, such as critical thinking, ecological literacy, creativity, and independence, in the fields of science, social studies, and Physical Education (PE) (Indrasari & Wulandari, 2023, 2024; Putri & Rezanah, 2024; Ramadhana et al., 2022; Suganda et al., 2022). Meanwhile, basic motion games involving running, jumping and throwing have been shown to align with the motor development stages of primary school children (Aliriad, Da'i, et al., 2023; Aliriad, 2024). These games have been shown to improve not only motor skills but also social and affective competencies when integrated into PE learning (Dike et al., 2023). Furthermore, contextual games and project-based activities outside the classroom have been shown to strengthen fundamental movement skills (Aliriad et al., 2024; Aliriad, Soegiyanto, et al., 2023). For example, frog jumping activities can improve long jump ability (MZ et al., 2023) and gamebased models can facilitate more effective mastery of athletic skills in primary school students (Salman & Darsi, 2020). This approach has even been developed into a game-based athletic model that increases the effectiveness of basic skill mastery (Sukirno & Pratama, 2019).

Although various studies have proven the effectiveness of project-based learning (PjBL) in improving thinking skills and learning motivation, and of basic motion games in developing motor and social skills, the integration of both in the context of Penjas learning in elementary school has rarely been studied systematically. Previous studies have mostly focused on the application of CHD in academic subjects or on using basic motion games to improve motor skills. However, research combining PjBL and basic motion games within a structured learning design according to the national curriculum remains limited. This creates a research gap, particularly with regard to how the two approaches can complement each other to create an active, enjoyable and meaningful learning experience for primary school students.

This study's novelty lies in its Model Project-Based Learning (PjBL) design, which integrates basic motion games in a contextual, participatory and fun way. Unlike previous studies that only highlighted PjBL or basic motion games separately, this study presents a combination of both within the Penjas learning framework, in line with the latest National Curriculum. This design aims to improve students' fundamental movement skills and foster active engagement, collaboration, critical thinking and social skills through structured play activities. Thus, this study makes a valuable contribution to the development of a holistic Penjas learning model that meets the developmental needs of 21st-century elementary school children.

The study aims to implement and evaluate the PjBL model based on basic motion games for teaching Penjas in primary schools. The main goal is to enhance students' engagement,

motivation and fundamental movement skills holistically, while bridging the gap between innovative learning theories and their application in classroom practice.

METHODS Type and Design

This study employs a quasi-experimental approach with a pre-test/post-test control group design (Achen, 2023; Habes, 2021). Two sample groups, an experimental class and a control class, were given a pre-test and a post-test to evaluate the effectiveness of Project-Based Learning (PjBL) using basic motion games, compared to conventional methods. The subjects were 60 fourth-grade students from Elementary School State 12 Purwodadi, selected through purposive sampling: 30 in the experimental class and 30 in the control class. The instruments used included basic movement skills tests (locomotor, non-locomotor and manipulative indicators), student activity observation sheets and study motivation questionnaires. The validity of these instruments was obtained through expert judgement and limited trials. A quasiexperimental design was chosen due to limitations in class randomisation, enabling an intact group to be used while still allowing a controlled comparison of the treatment's effectiveness.

Data and Data Sources

The data used in this study are quantitative, derived from students' basic movement skill scores and learning motivation. The data sources consist of primary and secondary data. Primary data include the results of students' basic movement skill tests conducted through pretests and posttests, student learning motivation questionnaires, and observations of student engagement during the learning process. Secondary data include lesson planning documents and student academic data obtained from the school.

Data Collection Technique

Data collection techniques in this study were conducted through three main methods. First, a basic motor skills test was used to measure the improvement of students' motor abilities (Hu et al., 2023; Tun et al., 2023).

Table 1. Research Measurement Instruments

| No. | Instrument | Measured Aspects | Scale Type | Measurement Time |
|-----|------------------------------------|---|--------------------|----------------------------|
| 1. | Basic Movement Skills Test | - Sprint - Long jump - Throw the ball (object) | Likert Scale (1-5) | Pretest & Posttest |
| 2. | Student Activity Observation Sheet | - Active participation - Collaboration with friends - Enthusiasm during learning | Rating scale (1-4) | During learning |
| 3. | Learning Motivation Questionnaire | - Interest in PE lessons - Student curiosity - Persistence and desire to learn more | Likert Scale (1-5) | Posttest (after treatment) |

This test was administered twice, before (pretest) and after (posttest) the treatment, with assessments based on a rubric that complies with PE standards in elementary schools. Second, observations of student activities were conducted during the learning process using a validated

observation sheet. Aspects observed included active participation, collaboration, and student enthusiasm in completing the basic movement game project. Third, a learning motivation questionnaire was administered after the treatment was completed (posttest), using a Likert scale to assess students' affective aspects, such as interest, curiosity, and desire to continue learning in the context of PE learning.

Data Analysis

Data analysis was conducted using descriptive and inferential statistics. Descriptive statistics were used to describe the mean, standard deviation, and minimum and maximum scores of the pretest and posttest results. Normality tests (Kolmogorov-Smirnov) and homogeneity tests (Levene's Test) were conducted to ensure the feasibility of the parametric tests. An independent t-test was used to determine significant differences between the experimental and control groups in posttest scores. The effectiveness of improving learning outcomes was analyzed using N-Gain, which is interpreted in low, medium, and high categories.

RESULTS AND DISCUSSION

The basic motor skills test results in Table 2 were analyzed using descriptive statistics to determine the development of scores before and after treatment. The analysis results showed that the experimental group experienced a significant increase in scores, with an average pretest score of 61.3 (SD = 7.2) and a posttest score of 83.5 (SD = 6.8). This increase is equivalent to an N-Gain of 58.2%, which is included in the moderate category. Meanwhile, the control group showed a lower increase, from an average pretest score of 62.1 (SD = 6.9) to 71.2 (SD = 7.1), with an N-Gain of 29.9%, which is included in the low category. These findings indicate that the learning model applied to the experimental group is more effective in improving students' basic motor skills.

Table 2. Average Score of Basic Movement Skills

| Group | Pretest (Mean ± SD) | Posttest (Mean ± SD) | N-Gain (%) | Category |
|------------|---------------------|----------------------|------------|-----------|
| Experiment | 61.3 ± 7.2 | 83.5 ± 6.8 | 58.2 | Currently |
| Control | 62.1 ± 6.9 | 71.2 ± 7.1 | 29.9 | Low |

Table 3. Normality and Homogeneity Test of Posttest Data

| Group | Kolmogorov-Smirnov (Sig.) | Distribution Information | Levene's Test (Sig.) | Variance Description |
|------------|---------------------------|--------------------------|----------------------|----------------------|
| Experiment | 0.200 | Normal | 0.353 | Homogeneous |
| Control | 0.184 | Normal | | |

Based on the results of the normality test in Table 3 using the Kolmogorov-Smirnov test, a significance value of 0.200 was obtained for the experimental group and 0.184 for the control group. Both values are greater than the significance limit of 0.05, which means that the posttest data on basic motor skills in both groups are normally distributed. Furthermore, the results of the homogeneity of variance test using Levene's Test showed a significance value of 0.353,

which is also greater than 0.05. This indicates that the data variance between the experimental and control groups is homogeneous or equal. Thus, it can be concluded that the data meets the assumptions of the parametric test, so that further analysis using the independent t-test can be carried out validly.

The results of the independent t-test on the post-test scores for basic motor skills in Table 4 show a significance value of 0.000 ($p < 0.05$), indicating a significant difference between the experimental and control groups. This finding indicates that the Project-Based Learning (PjBL) model based on basic motor games has a positive and significant influence on improving students' basic motor skills. Thus, this approach is proven to be more effective than the conventional learning method used in the control group.

Table 4. Independent t-Test Results for Posttest

| Variables | Sig. (2-tailed) | Information |
|-----------------------|-----------------|----------------------------|
| Basic Movement Skills | 0,000 | Significant ($p < 0.05$) |

The results of observations of student activities during the four weeks of learning in Table 5 show a quite striking difference in the level of engagement between the experimental and control groups. The average observation score for student activity in the experimental group reached 87.4%, which is included in the very active category. This reflects that students are enthusiastically involved, actively participate, and demonstrate high collaboration in basic movement game-based learning activities with the PjBL approach. In contrast, the control group only achieved an average of 68.2%, with a fairly active category, which indicates that student engagement tends to be lower, with less consistent participation and less intense learning enthusiasm than the experimental group. These findings strengthen the effectiveness of the PjBL approach in increasing student activeness and engagement during the PE learning process.

Table 5. Average Student Activity Observation Scores

| Group | Average Activity (%) | Category |
|------------|----------------------|--------------|
| Experiment | 87.4 | Very Active |
| Control | 68.2 | Quite Active |

The results of the learning motivation questionnaire analysis showed that students in the experimental group had a higher level of learning motivation than the control group. The average learning motivation score in the experimental group reached 85.6 on a maximum scale of 100, which is in the high category. This indicates that the project-based learning approach combined with basic movement games successfully increased students' interest, curiosity, and affective involvement in the PE learning process. Meanwhile, the control group only obtained an average score of 72.3 which is in the medium category, reflecting lower learning motivation. These findings indicate that the PjBL model is able to create a more interesting and challenging learning experience for elementary school students.

Table 5. Average Learning Motivation Score

| Group | Average Score (max: 100) | Category |
|-------|--------------------------|----------|
|-------|--------------------------|----------|

| | | |
|------------|------|-----------|
| Experiment | 85.6 | Tall |
| Control | 72.3 | Currently |

PE instruction at the elementary school level still faces several challenges, particularly the lack of varied learning methods that accommodate students' movement needs, creativity, and motivation. In practice, PE activities focus less on mastering instructional techniques and less on activating physical, cognitive, and affective learning. (Hanief, 2017; Rusmawati, 2016) As a result, students' basic motor skills develop only to a limited extent, and their participation in learning is low.

This research shows that implementing a Project-Based Learning (PjBL) model based on basic movement games can address these issues. Students are not only involved in movement practice but are also given space to be creative, collaborate, and solve challenges contextually. This strengthens the research findings Aliriad, (2023) and Satria et al., (2023) which states that game- and project-based learning can significantly improve students' basic motor skills and learning motivation. Aliriad et al., (2025) in his study, he showed the effectiveness of circuit games with auditory sequences in improving the motor coordination of elementary school children.

This finding also supports the results of Aji & Indahwati, (2023) and Mukarromah et al., (2022) which proves that integrating traditional games and project-based activities can strengthen children's locomotor and social-emotional skills. Implementing PjBL in the classroom also encourages the development of critical thinking skills and student independence (Faradhillah & Zahara, 2021; Miharja et al., 2021; Ramadhana et al., 2022).

From a theoretical perspective, this model is very relevant to John Dewey's progressive approach, which emphasizes the importance of real and meaningful learning experiences, as well as Vygotsky's constructivist theory (Kusuma et al., 2022) which emphasizes social learning through interactions between individuals. The game project in this study provides a forum for students to discuss, design, and implement movement activities that align with the basic movements they perform daily.

The PjBL model that was implemented was also proven to have a positive impact on students' learning motivation, as reported by Yuliawan & Arsil, (2024) in the context of higher education, and Salman & Darsi, (2020) in elementary education. In addition to cognitive and affective aspects, this approach also plays a role in strengthening soft skills such as communication, collaboration, and student leadership during project implementation (Aliriad, Soegiyanto, et al., 2023).

However, this study has several limitations. First, the PjBL model requires careful planning and a significant amount of time. Second, implementing the project in a classroom with diverse student abilities requires a differentiation strategy to ensure equitable participation for all students. Third, because the study was conducted in only two classrooms, generalizations of the findings should be made with caution.

This research makes a significant contribution to the development of innovative, contextual, and collaborative PE learning strategies. This aligns with global research trends related to children's motor skills training and innovations in sports learning. (Bile et al., 2021; Winasa, 2021). This finding is also in line with (Febriani & Budiana, 2017; Fernando, 2022; Sulistyono & Sceisarriya, 2021), which emphasizes the importance of innovation in learning to increase students' motivation and enthusiasm for learning.

The PjBL model, based on basic movement games, is worthy of consideration as a systematic approach to PE learning at the elementary school level. This model also opens up opportunities for cross-subject collaboration, the development of project-based teaching tools, and further research at broader levels and contexts.

CONCLUSION

The Project-Based Learning model based on basic movement games has been proven effective in improving basic movement skills and learning motivation of elementary school students. This study presents novelty by adapting the project approach to PE, strengthening the theory of constructivism and experiential learning. Methodologically, the experimental design provides strong evidence for the effectiveness of this model, and practically, this model can be an alternative strategy that is fun, meaningful, and contextual for students. In future research, it is recommended that this model be tested at different levels and school contexts, and studied more deeply through a qualitative approach to explore students' and teachers' experiences in its implementation.

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