Development of a Barcode-Based Student Worksheet (LKPD) for the Physical Education, Sports, and Health (PJOK) to Enhance Learning Outcomes of Third-Grade Elementary School

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Keywords
Student Worksheet; Barcode; Learning Outcomes; Physical Education, Sports, and Health

ABSTRACT
This study aims to develop and evaluate a barcode-based Student Worksheet (LKPD) designed to improve learning outcomes in Physical Education, Sports, and Health (PJOK) for third-grade elementary school. The problem emerged from observations and interviews conducted at SDN 1 and SDN 2 Merbau Mataram, which revealed that the learning process was still dominated by lecture-based instruction and standard textbooks let to student boredom, difficulty maintaining focus, and limited exposure to technology-supported teaching materials. The study adopted a Research and Development (R&D) approach employing the ADDIE model, encompassing five phases: Analysis, Design, Development, Implementation, and Evaluation. Validation results demonstrated that the barcode-based LKPD was very valid, achieving score of 93.3% from content experts, 95.4% from media experts, and 89.1% from language experts. The effectiveness test demonstrated a moderately effective category, supported by the results of the normality test (0.010 for the small-scale trial; 0.021 for the large-scale trial), a homogeneity test result of 0.199, a t-test significance value of 0.0219, and an N-Gain score of 0.611. Therefore, the barcode-based LKPD developed serve as an innovative alternative learning medium that effectively supports PJOK instructional activities and significantly enhances third-grade elementary school students' learning outcomes

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INTRODUCTION

The improvement of learning quality in elementary schools continues to receive significant attention in line with the demands of the Merdeka Curriculum, which emphasizes active, contextual, and student-centered learning. Ideally, the learning process requires instructional materials that engage students physically, intellectually, and emotionally in learning activities. This need is particularly critical in Physical Education, Sports, and Health (PJOK), a subject that involves activities, movement exploration, contextual situations, and integrated conceptual understanding. However, field observations reveal that the implementation of active learning still faces significant challenges. In several elementary schools, particularly in the Merbau Mataram area, learning activities continue to be conducted

conventionally through lecture-based methods, rendering student passive. The limited availability of instructional tools that support exploratory activities results in students failing to obtain optimal and comprehensive learning experiences.

This issue becomes especially evident in the context of the use of Students Worksheets (*Lembar Kerja Peserta Didik*, LKPD). Preliminary observations at SDN 1 Merbau Mataram and SDN 2 Merbau Mataram indicate that teachers still rely heavily on textbook-based instruction without utilizing contextual and activity-oriented LKPD.

The LKPD currently available tends to be generic, lacks systematic structuring for reflective or movement-based tasks, and does not sufficiently motivate students to think actively. Student feedback further reinforces this problem, highlighting that LKPD materials are often presented rigidly, visually unappealing, and lacking clear exploratory guidance. Consequently, student participant and comprehension in PJOK remain low, and the potential for developing basic movement competencies as well as conceptual thinking is not optimally facilitated.

The literature supports the urgency of developing more innovative LKPD. Research conducted by Sari, Taufina, and Fachruddin shows that LKPD designed using the Project-Based Learning (PjBL) model in elementary schools is validated in terms of content, practicality, and effectiveness in increasing student engagement.[1] Meanwhile, Rahayuningsih finds that LKPD using a scientific approach in Social Studies subjects proves highly valid and exerts a significantly influence on student learning outcomes.[2] In addition, Wulandarai and Dorisno successfully develop scientific LKPD for thematic materials for second-grade student elementary school with very high validity. [3] These studies confirm that constructivist and scientific approaches in LKPD are indeed effective, yet such approaches have not been widely applied in PJOK learning.

The analysis of existing instructional materials further supports the need for innovation in LKPD. The LKPD currently in use tend to take the form of simple task sheets that lack components for physical activity or conceptual reflection. Needs analysis reveals that teachers express the necessity for more varied and systematic instructional content, while students desire clear activity guidelines accompanied by engaging visual supports. These findings align with prior research on character-integrated LKPD development in non-PJOK subjects, which demonstrates that such worksheets achieve high validity and effectively enhance students' responsibility and discipline.[4] Instructional materials encompass not only academic content but also attitudes and skills that students must acquire to attain the competencies stipulated by the government.[5] Effective instructional materials therefore address all three domains of competence: cognitive, affective, and psychomotor. Moreover, comprehensive teaching materials include learning objectives, student usage instructions,

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[1]Farida Lifda Sari,Taufina, 'Pengembangan Lembar Kerja Peserta Didik(LKPD)Dengan Menggunakan ModelPJBL DiSekolah Dasar', 4.4 (2020), 813–20 <https://doi.org/10.31004/basicedu.v4i4.434>.

[2]Dwi Indah Rahayuningsih, Mustaji, Waspodo Tjipto Subroto 'SAINTIFIK UNTUK MENINGKATKAN HASIL BELAJAR MATA PELAJARAN IPS BAGI SISWA KELAS IV SEKOLAH DASAR Mahasiswa Program Pascasarjana , Prodi Pendidikan Dasar , Universitas Negeri Surabaya , Dosen Pascasarjana , Prodi Pendidikan Dasar , Universitas Negeri Suraba', 4.2 (2018).

[3] Febria Wulandari, Dorisno, 'Pengembangan Lembar Kerja Peserta Didik Berbasis Pendekatan Saintifik Pada Pembelajaran Tematik Subtema Merawat Tumbuhan Untuk Siswa Kelas Ii Sekolah Dasar', 2020.

[4] Mahilda Dea, 'Integrated Lkpd Development For Developing The Character Values Of Responsibility , Discipline And Achievement', 2014, 36–47.

[5]Muhammad Nuryogatama, Tono Sugihartono, and Ari Sutisyana, 'Pengembangan Lembar Kerja Peserta Didik (LKPD) PJOK Senam Lantai Meroda Berbasis Penguatan Pendidikan Karakter Untuk Peserta Didik Kelas VII SMP Negeri 18 Kota Bengkulu', *SPORT GYMNASTICS : Jurnal Ilmiah Pendidikan Jasmani*, 1.2 (2020), 1–9 <https://doi.org/10.33369/gymnastics.v1i2.12804>.

complete or summary content, evaluation instruments, and a glossary.[6,7] Recent developments indicate that audio-based LKPD can be applied across all school subjects.[8,9] LKPD serves as one of the primary means to support and facilitate teaching-learning activities, thereby fostering positive interaction between students and teachers.[10] Consequently, LKPD plays a pivotal role in PJOK instruction and constitutes an essential component that should be present in every PJOK learning procedure, as these worksheets function as a key reference that enables teachers to deliver instructional content effectively to their students.[11]

Preliminary observations conducted at SDN 1 Merbau Mataram and SDN 2 Merbau Mataram confirm that learning process remain predominantly teacher-centered, dominated by lecture methods and one-way instructions. The need analysis results further indicate that the teaching materials employed by teachers are still confined to standard textbooks without the support of contextual, activity-oriented LKPD. The currently available instructional materials consist only of textbooks and simple worksheet, which prove inadequate in facilitating students' needs for active engagement and meaningful learning experience. Observational documentation corroborates these findings by revealing low levels of student interaction and participation during lessons. Teachers report a clear need for more diverse teaching media, particularly activity-based LKPD that guide students toward independent conceptual understanding. From the students' perspective, the majority express difficulty in grasping the material due to its unappealing, poorly structured presentation and the absence of exploratory. These conditions highlight a significant gap between the requirements of activity-based learning and the availability of relevant teaching media. Accordingly, the development of innovative LKPD that meets contemporary instructional demands emerges as an urgent priority.

The limited availability of instructional materials and infrastructural facilities demonstrates that schools currently lack learning instruments specifically designed to foster student competencies in accordance with curriculum demands, including Student Worksheets (LKPD). Preliminary observation and interviews reveal that the LKPD currently used remains general, lacks contextual relevance, and is not designed to foster independent learning activities and higher-order thinking skills, which constitute the main variables of this study. Teachers predominantly rely on packaged textbooks and adopt a teacher-centered approach, which prevents students engaging in active and meaningful learning experiences. This situation directly contributes to low learning outcomes, particularly in Physical

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[6] Novita Asna Wardati, Khozin Khozin, and M. Nurul Humaidi, 'Problematika Guru Pendidikan Agama Islam Dalam Menerapkan Penilaian Autentik Di Sekolah Dasar Ar-Rohmah', *Research and Development Journal of Education*, 9.1 (2023), 279 <https://doi.org/10.30998/rdje.v9i1.16099>.

[7] Reski Meliza and Rifda Eliyasni, 'Pengembangan Bahan Ajar Menggunakan Aplikasi Nearpod Pada Mata Pelajaran Pendidikan Pancasila Unit 5 Kegiatan Belajar 4 Kelas IV SD', *Journal of Practice Learning and Educational Development*, 3.2 (2023), 205–13 <https://doi.org/10.58737/jpled.v3i2.151>.

[8]Cahya Jendra, Wening Patmi Rahayu, and Ery Tri Djatmika Rudijanto Wahju Wardhana, 'Pengembangan Media Pembelajaran Berbasis Google Sites Untuk Meningkatkan Keaktifan Dan Hasil Belajar Siswa (Pada Mata Pelajaran Administrasi Transaksi Kelas XI BDP SMK Islam Batu)', *Jurnal MIPA Dan Pembelajarannya*, 4.3 (2024), 2.

[9] Muhammad Faisal Kansal, Liesna Andriany, and Ali Ali, 'Pengembangan LKPD Berbasis Audio Visual Dalam Pembelajaran Menulis Puisi Di Kelas X SMA Al-Wasliyah Pasar Senen Medan', *Sintaks: Jurnal Bahasa & Sastra Indonesia*, 4.1 (2023), 58–62 <https://doi.org/10.57251/sin.v4i1.1217>.

[10]N Suwastini, A Agung, and I Sujana, 'LKPD Sebagai Media Pembelajaran Interaktif Berbasis Pendekatan Saintifik Dalam Muatan IPA Sekolah Dasar', *Jurnal Penelitian Dan Pengembangan Pendidikan* , 6.2 (2022), 311–20 <https://ejournal.undiksha.ac.id/index.php/JJL/article/view/48304>.

[11] Ina Magdalena and others, 'Analisis Pengembangan Bahan Ajar', *Nusantara*, 2.2 (2020), 180–87.

Education, Sports, and Health (PJOK), as students rarely engage in structured review of the material.

Based on these finding, this study introduces a novel contribution through the development of LKPD characterized by contextual relevance, active engagement, process-skill orientation, and clearly defined learning steps that facilitate conceptual understanding. The specifications of the LKPD under development include: (1) the integration of problem-based activities and field exploration aligned with the distinctive features of PJOK content; (2) visually appealing and easily comprehensible layouts; (3) systematic work instructions that encourage physical activity and reflective learning; and (4) formative evaluations that enable students to monitor their own progress. These characteristics distinguish the developed LKPD from previous versions, which tend to be merely informative and do not guide students through active cognitive processes.

The urgency of this study is considerable because it provides a concrete solution to the needs of teachers and students in elementary schools, who still lack PJOK LKPD that are truly contextual and activity-based. The availability of systematic, valid, activity-oriented LKPD is expected to transform PJOK learning into a more participatory and meaningful process, simultaneously enhancing students' understanding of fundamental movement concepts and their physical engagement. Such improvement not only raises the overall quality of learning but also equips teachers with ready-to-use, relevant instructional materials. This study aims to develop PJOK LKPD that is valid, practical, and effective for elementary school learning. The resulting LKPD product is intended to increase students' physical activity and conceptual comprehension while serving as a replicable model for developing teaching materials in other contexts with similar characteristics.

RESEARCH METHOD

This study employed the Research and Development (R&D) method. The R&D approach aims to produce a new product or develop an existing one, such as instructional materials designed to enhance student leaning outcomes, thereby transforming students' learning attitudes form passive to active and diligent participation in the instructional process.[12] The development process followed the ADDIE model. Researchers selected ADDIE model to develop instructional learning because its structured, and logical.[13] In Addition, it is systematic sequence proved simpler and more applicable than other development models.[14,15] The model comprises five phases, represented by its acronym: Analysis, Design, Development, Implementation, and Evaluation.

The research subjects consisted of 29 students from SDN SDN 1 Merbau Mataram and 13 students at SDN 2 Merbaau Mataram as participants, along with one classroom teacher from each school. The instrument used for data collection was a questionnaire. This instrument was developed in the form of a validation questionnaire that involved three validators according to their areas of expertise, namely a media expert, a material expert, and a language expert. Data collection techniques included interviews, observations, the distribution of validation questionnaires, and response questionnaires. Qualitative data were

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[12] Risa Nur Sa'adah and others, 'Metode Penelitian R\&D (Research and Development): Kajian Teoretis Dan Aplikatif', 2020.

[13] Nila Ratna Dewi, I Astuti, and F A Rahmani, 'Penerapan Desain Pembelajaran Addie E-Learning Materi Bahasa Inggris Pada Siswa Sma', *Jurnal Ilmiah Mandala Education*, 8.4 (2022), 2774–84.

[14] Moses Adeleke Adeoye and others, 'Revolutionizing Education: Unleashing the Power of the ADDIE Model for Effective Teaching and Learning', *JPI (Jurnal Pendidikan Indonesia)*, 13.1 (2024), 202–9.

[15] Flowerina Kadek, 'LKPD Berbasis Pendekatan Kontekstual Materi Pengukuran Sudut Pada Mata Pelajaran Matematika Kelas IV SD', *Mimbar Pendidikan Indonesia*, 4.1 (2023), 100–111 <https://doi.org/10.23887/mpi.v4i1.65251>.

analyzed using reduction, presentation, and conclusion drawing. Quantitative data were analyzed using descriptive statistics by calculating the percentages of validity, practicality, and effectiveness scores using the following formula:

During the trial phase, the instruments used consisted of a teacher response questionnaire and a student response questionnaire to evaluate the practicality and validity of the developed LKPD. The data obtained from the validation results were then analyzed using the following formula to determine the percentage score, which served as the basis for assessing product quality.

$$\text{Percentage} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \text{ x } 100\%$$

Table 1. Product Validity Criteria

Criteria	Percentage Range
Very Valid	81-100%
Valid	61-80%
Sufficiently Valid	41-60%
Less valid	21-40%
Invalid	0-20%

Table 2. Product Practicality Criteria

Criteria	Percentage Range
Very Practical	81-100%
Practical	61-80%
Sufficiently Practical	41-60%
Less Practical	21-40%
Impractical	0-20%

RESULTS AND DISCUSSION

This study aimed to develop a barcode-based Student Worksheet (LKPD) for the Physical Education, Sports, and Health (PJOK) subject. The results showed that the developed LKPD was valid and practical in improving students' learning outcomes. The developed LKPD process employed the ADDIE model, which consists of five phases, described as follows:

Analysis

In the analysis phase, a needs analysis was conducted to identify the problems faced by teachers in delivering PJOK learning materials, particularly those related to the instructional materials that had been used to support the quality of learning. Subsequently, a further needs analysis was carried out to formulate solutions and to determine the type of supplementary instructional materials that were relevant and required by teachers and third-grade students at SDN 1 Merbau Mataram and SDN 2 Merbau Mataram during PJOK learning process. Overall, this phase proved essential in minimizing the problems that emerged during the learning process. For instance, students frequently experienced difficulties in understanding questions, as reflected in their low examination scores in PJOK.

Design

The design phase was as carried out to prepare the initial draft or prototype of the product to be developed. The product developed in this study was a barcode-based LKPD for the POJK subject, intended to enhance the learning outcomes of third-grade elementary school students (SD/MI). The LKPD design process included selecting the learning materials, collecting relevant references for LKPD development, formulating content

components aligned with learning objectives, preparing supportive icons or illustrations, developing instructional videos, and selecting applications that facilitated the LKPD creation.

In practice, Canva was utilized to design the LKPD draft, Microsoft Word was employed to generate QR barcodes containing instructional videos, Kinemaster was used in the video production process, and Pinterest served as a source for compiling illustrative images. The primary components of the developed LKPD included a front and back cover, preface, table of content, learning objectives, learning content, summary, competency test, answer key, and references. Thus, the barcode-based LKPD for PJOK subject was systematically designed to support the achievement of the learning objectives.

Figure 1. Barcode-based LKPD for the Physical Education, Sports, and Health (PJOK) Subject

KATA PENGANTAR

Bismillahirrohmanirrohim,

Alhamdulillahi Rabbil'alamiin, Puji syukur kehadirat Tuhan yang Maha Esa atas rahmat dan karunia-Nya sehingga Lembar Kerja Peserta Didik (LKPD) Pendidikan Jasmani Olahraga dan Kesehatan (PJOK) berbasis barcode ini dapat terselesaikan. LKPD ini dirancang sebagai salah satu sumber belajar yang inovatif dan interaktif untuk membantu peserta didik memahami materi dan gerakan PJOK secara lebih mendalam dan menyenangkan.

Penulis mengembangkan LKPD dengan memanfaatkan teknologi barcode untuk menghadirkan pengalaman belajar berbeda yang bertujuan meningkatkan motivasi dan keterlibatan peserta didik dalam proses pembelajaran. Penulis mengucapkan terimakasih kepada semua pihak yang telah membantu, sehingga pembuatan LKPD ini dapat terealisasikan. Saran dan kritik yang membangun sangat diharapkan untuk penyempurnaan LKPD ini di masa mendatang. Semoga LKPD ini dapat memberikan kontribusi positif dalam proses pembelajaran dan bermanfaat bagi peserta didik, guru, serta pihak-pihak yang berkepentingan dalam dunia pendidikan.

Bandar Lampung, januari 2025

Chandra Awaludin

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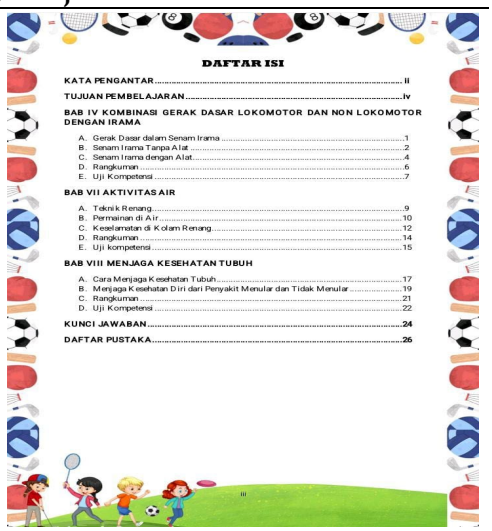

DAFTAR ISI

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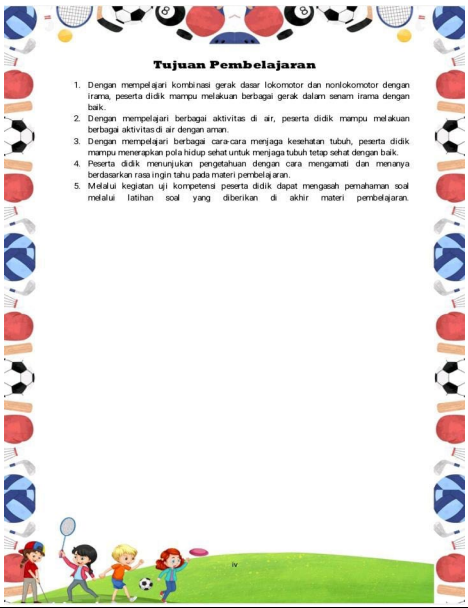
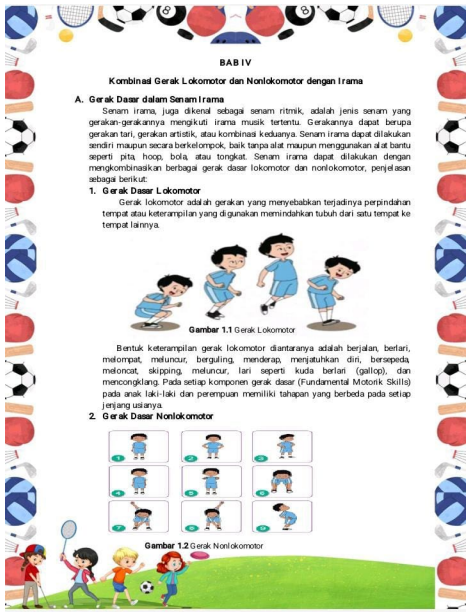
Preface | Table of Contents



Tujuan Pembelajaran

1. Dengan mempelajari kombinasi gerak dasar lokomotor dan nonlokomotor dengan irama, peserta didik mampu melakuan berbagai gerak dalam senam irama dengan baik.
2. Dengan mempelajari berbagai aktivitas di air, peserta didik mampu melakuan berbagai aktivitas di air dengan aman.
3. Dengan mempelajari berbagai cara-cara menjaga kesehatan tubuh, peserta didik mampu menerapkan pola hidup sehat untuk menjaga tubuh tetap sehat dengan baik.
4. Peserta didik menunjukan pengetahuan dengan cara mengamati dan menanya berdasarkan rasa ingin tahu pada materi pembelajaran.
5. Melalui kegiatan uji kompetensi peserta didik dapat mengasah pemahaman soal melalui latihan soal yang diberikan di akhir materi pembelajaran.

iv



BAB IV

Kombinasi Gerak Lokomotor dan Nonlokomotor dengan Irama

A. Gerak Dasar dalam Senam Irama

Senam irama, juga dikenal sebagai senam ritmik, adalah jenis senam yang gerakan-gerakannya mengikuti irama musik tertentu. Gerakannya dapat berupa gerakan tari, gerakan artistik, atau kombinasi keduanya. Senam irama dapat dilakukan sendiri maupun secara berkelompok, baik tanpa alat maupun menggunakan alat bantu seperti pita, hoop, bola, atau tongkat. Senam irama dapat dilakukan dengan mengkombinasikan berbagai gerak dasar lokomotor dan nonlokomotor, penjelasan sebagai berikut:

1. Gerak Dasar Lokomotor

Gerak lokomotor adalah gerakan yang menyebabkan terjadinya perpindahan tempat atau keterampilan yang digunakan memindahkan tubuh dari satu tempat ke tempat lainnya.

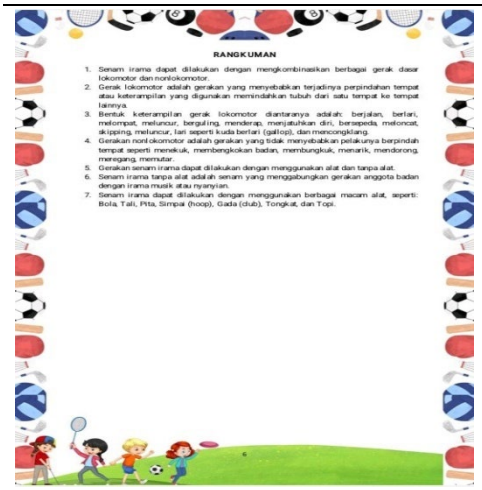
Gambar 1.1 Gerak Lokomotor

Bentuk keterampilan gerak lokomotor diantaranya adalah berjalan, berlari, melompat, meluncur, berguling, menderap, menjatuhkan diri, bersepeda, meloncat, skipping, meluncur, lari seperti kuda berlari (gallop), dan mencongklang. Pada setiap komponen gerak dasar (Fundamental Motorik Skills) pada anak laki-laki dan perempuan memiliki tahapan yang berbeda pada setiap jenjang usianya.

2. Gerak Dasar Nonlokomotor

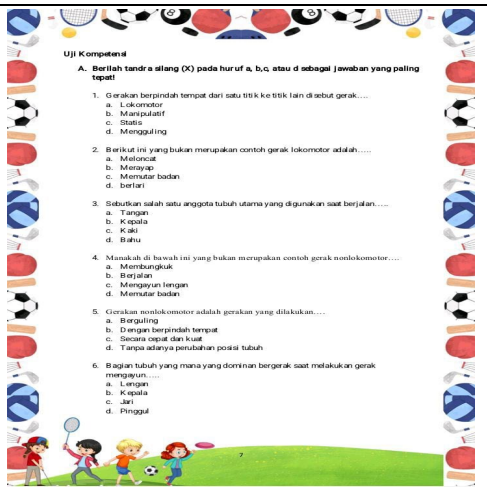
Gambar 1.2 Gerak Nonlokomotor

Learning Objectives | Learning Content



RANGKUMAN

1. Senam irama dapat dilakukan dengan mengkombinasikan berbagai gerak dasar lokomotor dan nonlokomotor.
2. Gerak lokomotor adalah gerakan yang menyebabkan terjadinya perpindahan tempat atau keterampilan yang digunakan memindahkan tubuh dari satu tempat ke tempat lainnya.
3. Bentuk keterampilan gerak lokomotor diantaranya adalah: berjalan, berlari, melompat, meluncur, berguling, merangkak, menjatuhkan diri, bersepeda, meloncat, skipping, meluncur, lari seperti kuda berlari (gallop), dan mencongklang.
4. Gerakan nonlokomotor adalah gerakan yang tidak menyebabkan pelakunya berpindah tempat seperti menekuk, membengkokan badan, membungkuk, menarik, mendorong, meregang, memutar.
5. Gerakan senam irama dapat dilakukan dengan menggunakan alat dan tanpa alat.
6. Senam irama tanpa alat adalah senam yang menggabungkan gerakan anggota badan dengan irama musik atau nyanyian.
7. Senam irama dapat dilakukan dengan menggunakan berbagai macam alat, seperti: Bola, Tali, Pita, Simpai (hoop), Gada (club), Tongkat, dan Topi.

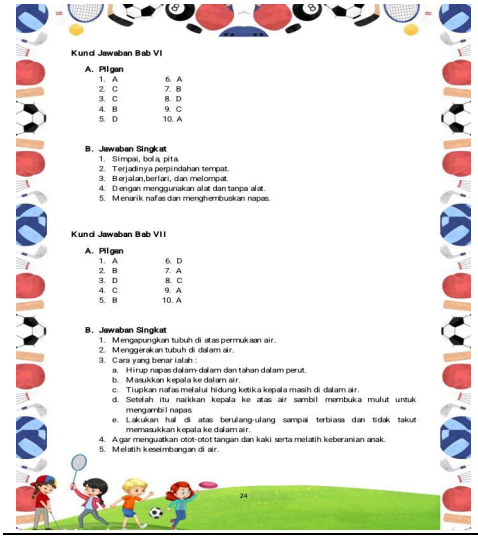


Uji Kompetensi

A. Berilah tandra silang (X) pada huruf a, b,c atau d sebagai jawaban yang paling tepat!

1. Gerakan berpindah tempat dari satu titik ke titik lain disebut gerak....
   a. Lokomotor
   b. Manipulatif
   c. Statis
   d. Mengguling
2. Berikut ini yang bukan merupakan contoh gerak lokomotor adalah.....
   a. Meloncat
   b. Merayap
   c. Memutar badan
   d. berlari
3. Sebutkan salah satu anggota tubuh utama yang digunakan saat berjalan.....
   a. Tangan
   b. Kepala
   c. Kaki
   d. Bahu
4. Manakah di bawah ini yang bukan merupakan contoh gerak nonlokomotor....
   a. Membungkuk
   b. Berjalan
   c. Mengayun lengan
   d. Memutar badan
5. Gerakan nonlokomotor adalah gerakan yang dilakukan....
   a. Berguling
   b. Dengan berpindah tempat
   c. Secara cepat dan kuat
   d. Tanpa adanya perubahan posisi tubuh
6. Bagian tubuh yang mana yang dominan bergerak saat melakukan gerak mengayun.....
   a. Lengan
   b. Kepala
   c. Jari
   d. Pinggul

Summary | Competency Test



Kunci Jawaban Bab VI

A. Pilgan

1. A
2. C
3. C
4. B
5. D
6. A
7. B
8. D
9. C
10. A

B. Jawaban Singkat

1. Simpai, bola, pita.
2. Terjadinya perpindahan tempat.
3. Berjalan,berlari, dan melompat.
4. Dengan menggunakan alat dan tanpa alat.
5. Menarik nafas dan menghembuskan napas.

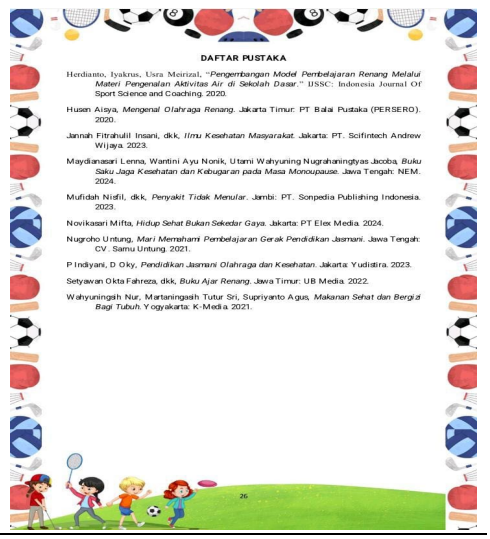
Kunci Jawaban Bab VII

A. Pilgan

1. A
2. B
3. D
4. C
5. B
6. D
7. A
8. C
9. A
10. A

B. Jawaban Singkat

1. Mengapungkan tubuh di atas permukaan air.
2. Menggerakan tubuh di dalam air.
3. Cara yang benar ialah :
   a. Hirup napas dalam-dalam dan tahan dalam perut.
   b. Masukkan kepala ke dalam air.
   c. Tiupkan nafas melalui hidung ketika kepala masih di dalam air.
   d. Setelah itu naikkan kepala ke atas air sambil membuka mulut untuk mengambil napas.
   e. Lakukan hal di atas berulang-ulang sampai terbiasa dan tidak takut memasukkan kepala ke dalam air.
4. Agar menguatkan otot-otot tangan dan kaki serta melatih keberanian anak.
5. Melatih keseimbangan di air.



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Answer Key | References

Development

In the development phase, the LKPD draft that had been designed was evaluated by experts in media, language, and content. Their evaluations resulted in assessments, comments, and suggestions for improving the developed product. The results of each expert review are presented below.

Table 3. Content Validation Results of the LKPD by Content Experts

Indicator	Content Experts				Criteria
	Validator 1	Validator 2	Validator 3	Percentage	
Alignment with Learning Aspects	100%	80%	100%	93,3%	Very Valid
Accuracy of Content	100%	95%	80%	86,6%	Very Valid
Content Update	100%	100%	100%	100%	Very Valid
Encouraging Curiosity	100%	90%	90%	93,3%	Very Valid
Learning Presentation	95%	90%	95%	93,3%	Very Valid
Overall Percentage			**93,3%**		
Overall Criteria			**Very Valid**		

As shown in Table 3, the validation conducted by three content experts indicated that all assessment aspects fell within the "Very Valid" category. Methodologically, these results justified the conclusion that the developed instructional content was feasible and necessary for classroom implementation. The aspect of alignment with learning objectives achieved 93.3%, content accuracy obtained 86.6%, content update reached 100%, the ability to stimulate curiosity scored 93.3%, and learning presentation attained 93.3%. The consistently high percentages across all aspects confirmed that the content not only met feasibility standards but also remained relevant to students' needs and aligned with the intended learning objectives. Thus, the validation outcomes provided strong justification that the content component of the LKPD highly feasible and essential for the learning process.

Table 4. Media Validation Results of the LKPD by Media Experts

Indicator	Media Experts				Criterion
	Validator 1	Validator 2	Validator 3	Persentase	
LKPD Appearance	100%	100%	100%	100%	Very Valid
LKPD Attractiveness	100%	90%	90%	93,3%	Very Valid
LKPD Content	100%	100%	80%	93,3%	Very Valid
Accuracy of LKPD Design	95%	90%	100%	95%	Very Valid
Overall Percentage			**95,4%**		
Overall Criteria			**Very Valid**		

As shown in Table 4, the validation conducted by the three media experts revealed that the LKPD obtained an average score of 95.4%, categorized as "Very Valid." The appearance of the LKPD received a perfect score of 100%, attractiveness reached 93.3%, content quality reached 93.3%, and design accuracy reached 95%. These findings substantiated that the developed LKPD not only satisfied media feasibility standards but also proved necessary due to its strong visual appeal, ease of use, and design suitability for the characteristics of the target learners. Consequently, the validators deemed the LKPD highly suitable for implementation in actual teaching and learning activities. This outcome demonstrated that the LKPD met high-quality standards in terms of appearance, attractiveness, content, and design precision.

Table 5. Language Validation Results of the LKPD by Language Experts

Indicator	Language Experts			Criterion
	Validator 1	Validator 2	Percentage	
Communicative ad Easy to Understand	100%	100%	100%	Very Valid
Dialog and Interactive	100%	100%	100%	Very Valid
Relevance to Learners	100%	80%	90%	Very Valid
Clarity	80%	80%	80%	Very Valid
Alignment with Language Rules	80%	80%	80%	Very Valid
Use of Terms, Symbols, or Icons	80%	90%	85%	Very Valid
Overall Percentage		**89,1%**		
Overall Criteria		**Very Valid**		

Based on Table 5, the validation carried out by the language experts showed that the LKPD scored 100% for communicativeness and clarity of understanding, categorized as "Very Valid." The dialogic and interactive aspects also scored 100%. Relevance to students reached 90%, clarity reached 80%, linguistic accuracy reached 80%, and the use of terms or symbols scored 85%. Overall, the language experts rated the LKPD at 89.1%, which confirmed the LKPD's linguistic quality as very valid.

Implementation

After the LKPD successfully the validation stage by content, media, and language experts and received the "very valid", the proceeded to the implementation phase within actual classroom instruction at elementary school (SD/MI). Implementation was carried out through two trial stage: a small-scale trial conducted at SDN 2 Merbau Mataram involving 13 third-grade students, followed by a large-scale trial at SDN 1 Merbau Mataram with 29 third-grade students.

The small-scale trial was first conducted at SDN 2 Merbau Mataram with 13 third-grade students. The students served as respondents and completed a post-test using the developed barcode-based LKPD. The results of the post-test from the small-scale trial are presented in following table.

Table 6. Post-Test Results of Students in the Small-Scale Trial

Activity	Lowest Score	Highest Score	Average	Passing Grade	Not Passing Grade
Small-scale post-test	60	84	80	11	2

Next, the large-scale trial was carried out at a different time with 29 students. This stage aimed to examine the consistency of the barcode-based LKPD's effectiveness in a broader classroom context. The post-test results from the larger-scale trial are displayed in Table 7.

Table 7. Post-Test Results of Students in the Large-Scale Trial

Activity	Lowest Score	Highest Score	Average	Passing Grade	Not Passing Grade
Large-scale post-test	64	92	80	24	5

The implementation phase involved administering the barcode-based LKPD in the third-grade PJOK learning process at elementary school, with 13 students participating in the small-scale trial and 29 in the large-scale trial. The effectiveness testing of the barcode-based LKPD on PJOK to improve third-grade learning outcomes yielded a "moderately effective" category. This finding is supported by the following statistical analyses.

Table 8. Normality Test (Kolmogorov-Smirnov dan Shapiro-Wilk)

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Skala Kecil	.218	13	.093	.815	13	.010
Skala Besar	.210	29	.002	.914	29	.021

a. Lilliefors Significance Correction

Based on the normality test results, the small-scale post-test obtained a significance value of 0.010, and the large-scale post-test obtained 0.021. These values indicate that the

significance scores from SPSS were greater than the alpha level of 0.05. Therefore, the data for both small-scale and large-scale post-tests were normally distributed.

Table 9. Homogenitas Test Results (Levene's Test)

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Hasil Belajar PJOK	Based on Mean	2.197	2	7	.182
	Based on Median	1.313	2	7	.328
	Based on Median and with adjusted df	1.313	2	5.000	.348
	Based on trimmed mean	2.053	2	7	.199

The homogeneity test produced a significance value of 0.199. Using a significance level of $\alpha = 0.05$, the result shows that t-count > r table, indicating that the students' PJOK learning outcomes had homogeneous or uniform variance.

Table. 10 t-Test (Independent Samples t-Test)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
nilai	Equal variances assumed	2.978	.092	-2.268	40	.029	-4.24138	1.86982	-8.02042	-.46233
	Equal variances not assumed			-2.854	39.050	.007	-4.24138	1.48621	-7.24740	-1.23536

The t-test showed a significance values of 0.029, which is lower than the significance level of 0.05. This result indicates that t-count < t-tabel, meaning that H0 was accepted. Consequently, it can be concluded that the barcode-based LKPD had significant effect on improving the PJOK learning outcomes of third-grade students.

Tabel 11. N-Gain Test Results

Criteria	Minimum	Maximum	Mean	Standard Deviation	Category
N-Gain Score	0.50	0.50	0.611	27.609	Moderate
N-Gain Percentage	50.00	50.99	61.149	27.60938	Moderate

The N-Gain test in this study was used to justify the effectiveness of the LKPD. Calculations revealed that N-Gain values from both the small-scale and large-scale post-test were categorized as moderate, with a score of 0.611. This finding indicates that the developed LKPD was effective in enhancing the learning process. Furthermore, the statistically significant improvement in students' learning outcomes was reinforced by the t-test results, demonstrating not only an observable gain score but also a significant difference between pre-test and post-test scores.

Evaluation

The evaluation stage represented the final phase of the ADDIE development; however, formative evaluation was also conducted at the conclusion of each preceding phase. In the analysis phase, evaluation was conducted through interview results with teachers and the test scores of third-grade students at the elementary school. In the design phase, evaluation began with reviewing the initial LKPD sketches until the final design was achieved. In the development phase, evaluation was performed based on the experts' assessments of the LKPD draft. Finally, in the implementation phase, evaluation focused on analyzing the effectiveness of student learning outcomes, measured through post-test, to determine the extent to which the LKPD succeeded in the learning process.

This study produced a barcode-based Student Worksheet (LKPD) that experts declared highly feasible, as evidenced by validation scores from content experts (93.3%), media experts (95.4%), and language experts (89.1%). These results confirm that the product met the required standards of content quality, visual presentation, and linguistic accuracy.[16] This result is consistent with Suwastini et al., who emphasize that interactive, science-based LKPD enhance the feasibility of teaching materials and increase student engagement.[17] Furthermore, the integration of barcodes linking videos and digital materials made the LKPD more communicative and interactive, supporting the findings of Kansal et al., who report that audiovisual media capture students' interest and increase their learning motivation.[18,19]

In terms of effectiveness, the independent samples t-test yielded a significance value of 0.029, while the N-Gain score was 0.611, placing the LKPD in the moderate effectiveness category. This outcome indicates that the barcode-based LKPD effectively improved PJOK learning outcomes. The results align with Nuryogatama et al., who found that character-based PJOK worksheet enhanced both comprehension and positive attitudes among junior high school students, as well as with Kadek, who report contextual-based LKPD in elementary-level mathematic enhance student engagement through the integration of cognitive, affective, and psychomotor dimensions.[20] Overall, the barcode-based LKPD therefore emerges as an innovative alternative instructional resource that overcomes the limitation of conventional methods and supports more active, varied, and relevant PJOK instruction aligned with 21st century educational demands.

CONCLUSION

Based on the research findings and data analysis, this study concluded that the development of a barcode-based Student Worksheet (LKPD) for the Physical Education, Sports, and Health (PJOK) subject in third-grade elementary school using the ADDIE model successfully produced a product that a valid, highly feasible, and moderately effective for classroom implementation. Validity was demonstrated through expert assessment, with content experts assigning a score of 93.3%, media experts 95.4%, and language experts

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[16] I Putu Aditya Purwadinata; I Komang Ngurah Wiyasa, 'Pengembangan LKPD Interaktif Berbasis Saintifik Pada Materi Organ Gerak Hewan Muatan IPA Siswa Kelas V SDN 1 Dauh Peken Tabanan', *Jurnal Pendidikan Dan Konseling*, 4.20 (2022), 1349–58.

[17] Suwastini, Agung, and Sujana.

[18] Nuryogatama, Sugihartono, and Sutisyana.

[19] Selly Adinda Mustika Murti and Rinie Pratiwi Puspitawati, 'Validitas E-LKPD Iinteraktif Berbasis Collabotarive Learning Pada Materi Pertumbuhan Dan Perkembangan Untuk Melatihkan Keterampilan Berpikir Kritis Peserta Didik', *Jurnal Inovasi Pembelajaran Biologi*, 5.1 (2024), 22–32 <https://doi.org/10.26740/jipb.v5n1.p22-32>.

[20] Melinina Putri Costadena and Ni Wayan Suniasih, 'E-LKPD Interaktif Berbasis Discovery Learning Pada Muatan IPA Materi Ekosistem', *Jurnal Penelitian Dan Pengembangan Pendidikan*, 6.2 (2022), 180–90 <https://doi.org/10.23887/jppp.v6i2.45848>.

89.1%, all of which fall within the "very valid" category. Meanwhile, the effectiveness testing revealed that the barcode-based LKPD contributed positively to improving student learning outcomes, achieving a moderate effectiveness category as evidenced by normality and homogeneity test, a t-test significance of 0.029, and an N-Gain score of 0.611. These results confirmed that the research hypothesis is accepted, indicating that the barcode-based LKPD serves as an innovative instructional alternative capable of supporting the successful PJOK learning and enhancing student engagement in the learning process.

Furthermore, the development of the barcode-based LKPD for PJOK in third-grade students through the ADDIE model is proven to be valid, feasible, and moderately effective, as evidence by the content expert validation score of 93.3%, media expert score 95.4%, language expert score of 89.1%, and N-Gain score of 0.611, and a t-test significance value of 0.029. The implication of this study indicate that the integration of barcodes into LKPDs can serve as a meaningful learning innovation that strengthens student engagement, improves access to learning materials through digital media, and assists teachers in delivering more varied, interactive, and 21st century educational demands. However, this study has several limitations. The trial was conducted in only two schools with a limited number of participants. The use of barcode-based technology also requires adequate device facilities, which may not be available in all school contexts. In addition, the LKPD development focused only on specific competencies in PJOK, which limits its generalizability to other subjects. Therefore, future researcher will need to expand the sample and research settings, develop barcode-based digital LKPD compatible with various devices, and examine their effectiveness in other subject areas and grade levels. Such extensions will contribute to creating more comprehensive digital learning tools and supporting broader improvement in learning quality.

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