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Implementation of the Basic Technique Learning Model for Baseball Games Based on Barcodes for Phase D Students of Class VII of SMP Negeri 16 Palembang

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Abstract

This study aims to describe the effectiveness of the application of Barcode media in learning basic techniques of baseball for phase D grade VII students of SMP Negeri 16 Palembang. The study used a qualitative descriptive method with data collection techniques in the form of observation, interviews, and documentation. Barcode media was developed to contain visual materials in the form of videos, images, and explanations of basic techniques, which were then applied in the Physical Education (PJOK) learning process. The results showed that the use of Barcode had a positive impact on improving student skills, especially in the aspect of catching with a high category achievement of 80.95%. In the aspect of throwing, 76.19% of students were in the high category, while in the aspect of hitting, 47.62% were in the high category and 52.38% were in the medium category. These findings indicate that Barcode media is effective in helping students understand basic techniques through clear, interactive, and easily accessible visualizations, thereby increasing motivation and the quality of learning. Overall, Barcode-based learning has been proven to be able to improve mastery of basic baseball skills and can be used as an alternative innovative learning model in the subject of PJOK.

Keywords: Barcode; Physical Education Learning; Basic Baseball Techniques; Learning Media

1. Introduction

Physical education in Indonesia has a strong legal basis in the national education system. Law Number 20 of 2003 concerning the National Education System emphasizes that physical education aims to develop students' potential to become healthy, knowledgeable, capable, creative, and character-based individuals. This is clarified in Article 37 Paragraph 1, which stipulates that physical education, sports, and health are mandatory components of the primary and secondary education curriculum. Furthermore, Minister of Education and Culture Regulation Number 22 of 2016 emphasizes that physical education aims to improve physical fitness, motor skills, social skills, and character building for students to be more active and sporty [1].

Physical education not only functions to develop physical abilities, but also the mental and social aspects of students. Physical education learning includes theoretical activities such as understanding anatomy, physiology, and sports knowledge, as well as practical activities in the form of physical activities designed to improve fitness, motor skills, cooperation, discipline, and sportsmanship [2].

One of the game materials taught in Physical Education is rounders, a popular traditional game involving two teams of 12 players each. This game requires physical activity such as running, hitting, throwing, and catching the ball, which plays a role in training dexterity, team cohesion, and sportsmanship [3]. In school environments, rounders is often used as a learning tool because it can train basic motor skills while instilling the values of cooperation, strategy, and honesty.

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For seventh-grade students in Phase D (aged 12–13), physical education plays a crucial role because they are in a stage of rapid physical, motor, and cognitive development. At this stage, students require a learning approach that is interactive, engaging, and relevant to their developmental needs. However, in practice, learning basic baseball techniques is often considered boring by students because the methods used are less innovative. The monotonous learning process makes students less active, lowers learning motivation, and results in less than optimal mastery of basic techniques. Furthermore, the development of digital technology also influences students' interests, who are more interested in using gadgets, playing games, or accessing social media than engaging in physical activity [4].

These conditions demand innovative learning models that can increase student engagement. One alternative is barcode-based media, or QR codes. These media provide simple and engaging visualizations that can help students grasp basic engineering material quickly and interactively. The use of barcodes aligns with the needs of Phase D students, who require visual, practical, and easy-to-understand learning. Barcode-based learning also provides a more enjoyable and motivating learning experience, thereby reducing student boredom in learning baseball.

Previous research supports the effectiveness of barcode-based media in learning. Hartoto et al. (2021) developed a QR Code-based athletics learning model and obtained positive results on student understanding [5]. Similarly, research by Febrianto et al. (2021) showed that the use of barcode media can improve student learning activities in elementary schools [6]. These findings confirm that simple digital media such as QR Codes can improve understanding, interaction, and learning motivation [6].

Based on the description, the use of Barcode-based learning model is considered relevant to improve the mastery of basic techniques of playing baseball in phase D students of grade VII of SMP Negeri 16 Palembang. This innovation is expected to create interactive, effective, fun learning, and be able to help students understand the basic principles of playing baseball more meaningfully. The research entitled "Implementation of Basic Technique Learning Model of Playing Baseball Based on Barcode for Phase D Students of Grade 7 at SMP Negeri 16 Palembang" produces learning media in the form of QR Code-based flash cards that function as a tool to improve the quality of PJOK learning at the junior high school level.

2. Material and methods

This study uses a qualitative descriptive approach with the aim of in-depth describing the application of Barcode media in learning basic techniques of playing baseball for phase D students of grade VII of SMP Negeri 16 Palembang. This approach was chosen because it allows researchers to understand learning phenomena in natural conditions through direct observation, interviews, and documentation, as well as emphasizing the meaning of students' learning experiences.

The research was designed through the stages of analysis, planning, implementation, and evaluation. In the initial stage, the researcher identified learning problems and conducted a literature review on the use of digital media in Physical Education (PJOK). Next, the researcher compiled a Barcode media kit containing visual materials in the form of videos, images, and information on basic baseball techniques. She also prepared research instruments in the form of observation sheets, interview guidelines, and documentation formats.

The research was conducted for 8–10 weeks at SMP Negeri 16 Palembang, involving seventh-grade students as subjects, who were selected because they were at the early adolescent stage of motor and cognitive development, making them suitable for visual-interactive learning. The object of the research was the application of Barcode media and students' responses to its use in PJOK learning.

Data collection was conducted through observation, interviews, and documentation. Observations were used to assess the learning process and student interaction with the media. Interviews were conducted to explore student and teacher perceptions of the effectiveness of Barcode, while documentation served to strengthen the research findings through visual evidence of learning activities. Indicators of research success were marked by increased mastery of basic techniques (throwing, catching, hitting) as well as increased student motivation and engagement during learning using Barcode.

All data was analyzed using the Miles and Huberman model, encompassing data reduction, data presentation, and conclusion drawing. The reduction process involved selecting relevant data and presenting it in narrative and visual documentation to facilitate pattern identification. Conclusions were drawn through a thorough interpretation of the data, demonstrating the effectiveness of the barcode media in enhancing understanding of basic baseball techniques.

3. Results and discussion

Based on the results of the assessment of students' skills in learning basic baseball techniques based on Barcode, it was found that most students experienced a significant increase in their abilities after participating in the learning process. The assessment was carried out on three main aspects, namely throwing, catching, and hitting, with a value range of 1–4 (1 = Poor, 2 = Sufficient, 3 = Good, 4 = Very Good). The analysis results showed positive developments in each aspect of basic techniques. The assessment was then categorized into three intervals, namely high, medium, and low, to provide a more comprehensive picture of the distribution of student abilities. The frequency and percentage of student achievement in each category showed that the majority of students were in the medium to high category, indicating that the use of Barcode media was effective in helping them understand and practice basic baseball techniques. These findings reinforce that visual-interactive media such as Barcode can improve students' motor skills more optimally than conventional learning methods.

The results of the study on the throwing aspect showed that students' abilities experienced a significant increase after the implementation of Barcode-based learning. A total of 16 students (76.19%) were in the high category, followed by 4 students (19.05%) in the medium category, and 1 student (4.76%) in the low category. This distribution indicates that the majority of students have been able to perform throwing techniques well, although further coaching is still needed so that more students reach the highest category. The proportion that still appears in the medium and low categories indicates that mastery of throwing techniques requires consistent practice, but overall these findings confirm that the use of Barcode media has a positive contribution to improving students' throwing skills in baseball.

The results of the study on the catching aspect showed very positive achievements, where 17 students (80.95%) were in the high category and 4 students (19.05%) were in the medium category, with no students in the low category. This finding indicates that catching is the skill that students have mastered most compared to other aspects. The dominance of the high category reflects that the implementation of Barcode-based learning can significantly improve catching abilities, because students more easily understand instructions through movement visualization and can make corrections independently. This has an impact on more accurate, controlled catch results, and according to the techniques taught.

The results of the research on the hitting aspect showed that students' abilities were in two categories, namely the high category with 10 students (47.62%) and the medium category with 11 students (52.38%), with no students in the low category. This pattern is similar to the findings on the throwing aspect, where the majority of students were still in the medium category, so that hitting skills, although quite good, still require improvement, especially in terms of technical consistency and hitting power. These findings indicate that Barcode-based learning has a positive influence on mastery of hitting techniques, but still leaves room for improvement so that students' skills can increase more evenly to the high category. Overall, the analysis of each aspect shows that catching skills are the most dominant skills mastered by students, followed by throwing and hitting skills, which is in line with the characteristics of the game of baseball where catching is the basis before throwing or hitting.

Based on the research results, the application of a barcode-based learning model for basic baseball techniques demonstrates that understanding the nature of learning models is an important foundation for designing effective learning processes. A learning model is understood as a conceptual framework that guides teachers in systematically planning, implementing, and evaluating learning. This aligns with Hartati et al.'s (2022) opinion, which states that a learning model is an approach designed to improve student skills through structured and enjoyable learning experiences [7].

Learning models not only serve as technical guides but also as strategies for creating active educational interactions between teachers, students, and learning media. By utilizing barcodes as an innovative medium, the learning process becomes more engaging, interactive, and relevant to the development of digital technology that is close to students' lives. This approach is in accordance with the views of Sahid et al. (2024) who emphasize that learning models must be able to integrate learning steps with clear objectives, appropriate media selection, and activities that encourage optimal student engagement [8].

The research also shows that understanding the nature of learning models enables teachers to design contextual and student-centered learning. Teachers no longer act as the sole source of knowledge, but rather as facilitators who guide students in exploring material through interactive media such as barcodes. Thus, the essence of learning models that prioritize systematic planning, technology utilization, and active student participation has been proven to support the improvement of basic baseball technical skills, while simultaneously fostering student interest and motivation in learning.

Based on the research results, the application of the Barcode-based learning model in learning the basic techniques of baseball has been proven to have a positive impact on mastery of throwing, catching, and hitting skills. Observational data shows an increase in students' abilities in every aspect of basic techniques after participating in learning using Barcode media, where students can see repeated demonstrations of movements through videos connected to the Barcode. In theory, mastery of basic techniques such as throwing, catching, and hitting the ball is the main foundation in baseball. According to Harris et al. (2024), mastery of basic techniques allows students to understand the mechanics of the game while improving motor coordination, agility, and physical strength [9]. For example, high, horizontal, and long throws help students develop arm muscle strength and target accuracy, while catching skills train concentration and reflexes.

The results of the study also showed that ball-hitting skills, which were initially the biggest challenge for students, experienced significant improvement after using Barcode. This is in line with the opinion of Muni Baitanu et al. (2024) who emphasized that repeated practice assisted by visual media can accelerate the mastery of ball-hitting skills because students can observe the details of the movement more clearly before practicing them on the field [10]. Furthermore, the more interactive learning atmosphere through Barcode has been shown to increase student motivation. They not only receive instructions from the teacher but also have the opportunity to learn independently by accessing materials through Barcode. This is in line with the findings of Hartoto et al. (2021) that the integration of technology such as QR Code or Barcode in physical education can encourage active student involvement while increasing the effectiveness of motor learning [5].

The research results show that the implementation of a barcode-based learning model for basic baseball techniques can improve students' understanding, skills, and learning motivation. This learning model is designed to combine the physical activity of baseball with technological innovation through the use of barcode media. Each barcode contains learning materials, ranging from videos of throwing, catching, and hitting techniques, so students can scan them using devices such as cellphones, tablets, and the like and access the materials independently.

This learning model aligns with the concept of blended learning, where the learning process combines direct interaction in the field with digital learning resources. This is in line with the opinion of Hartoto et al. (2021) who stated that the use of QR Code or Barcode-based media in physical education increases student activeness because they gain access to broader and more flexible materials [5]. In implementing the learning, the teacher acts as a facilitator who guides students in understanding the basic techniques of playing baseball through two main stages: digital theory accessed through Barcode and direct practice in the field. Students can watch videos of movements before practicing them, so the learning process becomes clearer, more structured, and more engaging. This approach is also in line with the findings of Febrianto et al. (2021) who stated that interactive media can increase student engagement because it combines visual, auditory, and kinesthetic aspects [6].

This learning model offers several advantages. First, students can learn at their own pace, as Barcode allows repeated access to the material. Second, learning becomes more student-centered, with students actively exploring basic techniques through independent and group practice. Third, the integration of technology makes learning more relevant to current developments, thereby increasing student interest and motivation to learn. Research findings show a significant increase in basic technique skills after implementing this model. For example, the percentage of students who mastered the skills of throwing, catching, and hitting a ball in the "good" and "very good" categories increased compared to before using Barcode. This proves that the Barcode-based learning model is not only effective in transferring knowledge but also in developing students' motor skills.

Based on various previous studies, learning the basic movements of baseball has been studied from various perspectives, ranging from equipment modifications, learning models, to the use of innovative media. For example, research by Khayri Fazlullah et al. (2024) at Muhammadiyah 22 Middle School Setiabudi Pamulang showed that the application of a direct practice-based learning model was able to significantly improve students' baseball hitting and catching skills after going through two learning cycles [11]. These results are in line with research by Muni Baitanu et al. (2024) at Sonraen State Elementary School, Kupang, which found that the use of hanging balls as a medium for baseball hitting practice successfully increased students' hitting accuracy [10].

Harris et al.'s (2024) research at UPT SDN KIP V Barabaraya emphasized the importance of the pair-based learning model in improving baseball throwing and catching skills [9]. Their research results showed that student involvement in pair-based learning made the learning process more interactive and motivating, so that basic techniques could be mastered better. This is supported by Cartono's (2020) research at SD Negeri 179/IX Tanjung Harapan, which implemented the Teams Games Tournament (TGT) cooperative learning model and succeeded in significantly improving baseball hitting, catching, and throwing skills [12].

Simanungkalit et al.'s (2024) research added Barcode elements and the use of plastic balls in baseball learning at SD Negeri 070988, showing that innovative learning media can increase students' interest and playing skills [13]. This research is supported by Utama (2021) who found that the use of technology-based media, including Barcode, not only improves motor skills but also motivates students to be more active in the learning process [14]. Amirunni'am et al. (2024) showed that the integration of traditional baseball games with Barcode-based learning methods improves students' locomotor skills [15]. Students' Minimum Completion Criteria (KKM) increased significantly from cycle I to cycle II, where students who completed learning increased from 10% to 43% after the implementation of the innovative media.

These findings are consistent with Priyanto's (2021) research at Turi 2 Elementary School, Magetan, which implemented the Problem-Based Learning (PBL) model in basic manipulative movement learning for throwing, catching, and hitting, and was proven to significantly improve student learning outcomes [16]. In addition, Tumaloto & Ruslan (2023) at SDN 70 Kota Tengah found that rounders can be used effectively to train basic movement skills of elementary school students, especially in the aspect of gross motor coordination [17]. Based on the various studies above, it can be said that learning basic movements of rounders will be more effective if supported by innovative learning models, the use of interactive media such as Barcodes, appropriate tool modifications, and the application of collaborative methods. All of these factors contribute positively to improving students' basic technical skills, both in the aspects of throwing, catching, and hitting the ball.

4. Conclusion

Based on the results of research on the application of the Barcode-based learning model for basic baseball techniques in Phase D grade 7 students at SMP Negeri 16 Palembang, it can be concluded that the use of Barcode media has been proven to improve students' understanding of basic baseball techniques, especially in throwing, catching, and hitting skills. In addition, learning becomes more interactive and enjoyable because students can access materials through easy-to-use digital media. The integration of Barcode technology also provides an independent and flexible learning experience, so students can learn game techniques anytime and anywhere according to their needs.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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