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Comparison of the Effectiveness of Discovery Learning and Direct Instruction Models in Physical Education Learning Basketball Material

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ABSTRACT

This study aims to analyze and compare the effectiveness of the Discovery Learning and Direct Instruction models in improving basic basketball technical skills in students at SMA Negeri 5 Makassar. This study used a quasi-experimental design with a pretest–posttest control group. The sample size was 40 students divided into two groups: an experimental group receiving the Discovery Learning model and a control group receiving Direct Instruction. The research instrument included a basic basketball technical test covering passing, dribbling, and shooting. Data were analyzed using descriptive and inferential statistics, including prerequisite tests, paired sample t-tests, independent t-tests, and gain score calculations. The results showed that both learning models significantly improved students' basic technical skills. However, the Discovery Learning group showed a higher gain score of 26.20 (56.2%) compared to the Direct Instruction group, which had a gain score of 17.30 (37.7%). Discovery-based learning provides a more meaningful learning experience, enhancing movement creativity, conceptual understanding, and active student participation. Conversely, Direct Instruction remains effective but tends to be more mechanistic and less exploratory. In conclusion, Discovery Learning is more effective when applied to physical education (PJOK) basketball. Teachers are advised to consistently integrate this model, but still combine it with Direct Instruction to provide a strong technical foundation. Further research is needed to examine its long-term impact and applicability to other sports materials or contexts.

Keywords : Discovery Learning, Direct Instruction, Basketball, Basic Technical Skills, PJOK Learning

INTRODUCTION

Physical Education, Sports, and Health learning plays a strategic role in developing students' physical, psychomotor, cognitive, and affective aspects comprehensively. As an integral part of the national curriculum, PJOK emphasizes not only mastery of movement skills but also character building, sportsmanship, cooperation, and a healthy lifestyle (Saputra & Prasetyo, 2020). In the 21st-century context, PJOK learning needs to adapt to

new pedagogical demands that emphasize critical thinking, creativity, and problem-solving skills. Therefore, the learning model used by teachers is a key factor in successful learning (Suharno, 2021). In the realm of sports learning, particularly basketball in high school, selecting the right learning model plays a crucial role in improving students' conceptual understanding, basic technical skills, and learning motivation.

In general, two learning models that are widely used and continually compared for their effectiveness in various educational contexts are Discovery Learning and Direct Instruction. Discovery Learning, as part of the constructivist approach, encourages students to actively engage in discovering concepts, understanding principles, and formulating knowledge through exploration and direct experience (Fitriyah & Kurniawan, 2021). This model is believed to enhance critical thinking skills, creativity, and independent learning because students are placed at the center of learning (student-centered). Consistently, recent research shows that Discovery Learning is effective in improving conceptual mastery and higher-order thinking skills in various subjects, including physical education (Sari et al., 2023).

On the other hand, the Direct Instruction model is a learning approach that emphasizes clear instructions, structured demonstrations, and gradual practice from the teacher to the students. This model is based on behaviorist theory, which focuses on stimulus-response and reinforcement in the learning process (Rosdiani & Pradipta, 2019). Direct Instruction has been proven effective in learning motor skills because it provides clear guidance, practical steps, and direct feedback from the teacher. Many studies have shown that this model is highly suitable for teaching basic sports techniques that require concrete examples and structured explanations, such as passing, dribbling, and shooting in basketball (Widiastuti & Ramadhan, 2021).

In the context of basketball learning, learning success is greatly influenced by students' ability to understand game concepts and master basic techniques. Basketball is a sport characterized by a combination of technique, tactics, and quick decision-making, requiring motor skills and a strong understanding of concepts (Pratama & Hidayat, 2022). Learning basic techniques such as passing, dribbling, and shooting requires a systematic approach while providing room for exploration so students can adapt to their individual learning styles.

Discovery Learning has the potential to improve students' understanding of game concepts and creativity when exploring movement. Conversely, Direct Instruction is highly effective in mastering basic movements that require structured procedures. However, the effectiveness of both models still depends on the context, classroom conditions, student readiness, and the characteristics of the material being taught. Research on high school students shows varying results when these two models are applied to sports learning, particularly basketball (Ramli et al., 2021).

At SMA Negeri 5 Makassar, physical education (PJOK) instruction, particularly basketball, still faces several challenges, such as low student participation, suboptimal mastery of basic techniques, and a lack of learning models that actively engage students. Teachers tend to use conventional, teacher-centered approaches, while curriculum changes demand more student-centered learning (Susanto & Rahmadani, 2022).

The main problem in basketball instruction in schools is how to choose the most appropriate learning model to improve students' technical skills and conceptual understanding. The Direct Instruction model is often considered effective in the early stages of learning basic techniques, but it does not encourage active student engagement in the learning process. Conversely, Discovery Learning can improve creativity and conceptual

understanding but is considered more difficult to implement for students with low basic motor skills (Nurjannah & Syahrir, 2020).

At SMA Negeri 5 Makassar, initial observations showed that some students still struggled to perform basic techniques such as chest passes, bounce passes, and dribbling correctly. Furthermore, student motivation in participating in basketball lessons tended to decline due to monotonous teaching methods and a lack of active student engagement. This situation necessitates an evaluation of the effectiveness of appropriate learning models for basketball instruction.

Several studies have examined these two models, but most of the research was conducted at the junior high or college level, not the high school level. Furthermore, many studies only examined one learning model without directly comparing them in the context of sports learning, particularly basketball. For example, research by Sari et al. (2023) highlighted the effectiveness of Discovery Learning in Physical Education (PJOK) learning, while research by Widiastuti & Ramadhan (2021) examined the effectiveness of Direct Instruction in basic sports technical skills. However, very little research has specifically compared these two models in high school basketball instruction, especially in public schools with heterogeneous student characteristics such as SMA Negeri 5 Makassar.

No study has integrated a comprehensive analysis of how these two models simultaneously affect the improvement of basic basketball techniques, student engagement, and understanding of game concepts. This research gap highlights the need for experimental studies comparing the two models in real-world learning settings.

The novelty of this research lies in the direct comparison between Discovery Learning and Direct Instruction in basketball instruction at SMA Negeri 5 Makassar by assessing several key indicators: (1) mastery of basic basketball techniques, (2) understanding of game concepts, and (3) student motivation and active participation. Furthermore, this study examines how high school students with varying levels of learning readiness respond differently to these two learning models.

This research also offers a new perspective on the integration of exploration-based learning models and structured learning models in the context of sports, so that the results are expected to provide practical references for PJOK teachers in choosing the right learning model according to learning objectives.

Based on theoretical foundations, empirical conditions at the school, and existing research gaps, this study was conducted to compare the effectiveness of Discovery Learning and Direct Instruction in basketball instruction at SMA Negeri 5 Makassar. This research focused on improving basic techniques, conceptual understanding, and active student participation. The results are expected to significantly contribute to the development of more effective, innovative, and student-centered physical education (PJOK) learning strategies.

Through a systematic experimental approach, this study seeks to provide empirical evidence regarding which learning model is more effective when applied to basketball instruction. Thus, this research not only enriches academic studies on learning models but also provides practical solutions for PJOK teachers addressing learning challenges in high schools.

METHODS

Research Type and Design

This study used a quasi-experimental research design with a pretest–posttest control group design. This design was chosen because the researchers did not have full control over

the student groupings, but it still allowed for a systematic comparison of two different treatments (Creswell & Creswell, 2018). In the context of Physical Education learning in schools, a quasi-experimental design is the most relevant approach because it takes into account the established classroom conditions and the heterogeneous characteristics of students (Sari et al., 2021).

The research design consisted of two groups: an experimental group taught using the Discovery Learning model, and a control group taught using the Direct Instruction model. Both groups were given pretests and posttests to measure improvements in basic basketball technique skills before and after the treatment. The Discovery Learning model was chosen because it is constructivist and encourages students to discover concepts through exploration, while Direct Instruction was chosen because it is effective in providing structured and systematic instruction, particularly for basic motor skills (Widiastuti & Ramadhan, 2021).

Research Variables

This study consists of two types of variables:

1. Independent variable
   Learning model
   a. Discovery Learning
   b. Direct Instruction
2. Dependent variable
   Students' basic basketball technical skills, including passing, dribbling, and shooting.

The dependent variable was selected based on the basic competency standards in high school physical education (PJOK), which emphasize mastery of basic basketball technical skills as the basis for further learning (Pratama & Hidayat, 2022). Previous studies have also confirmed that mastery of basic techniques is a key indicator of successful basketball learning in high school (Fitriyah & Kurniawan, 2021).

Population and Sample

The population of this study was all 11th-grade students of SMA Negeri 5 Makassar who participated in physical education during the current semester, totaling 120 students. The sampling technique used was purposive sampling, taking into account equivalence in initial abilities and learning schedules. The research sample consisted of 40 students, divided into two groups of 20 participants each:

1. 20 students in the experimental group (Discovery Learning)
2. 20 students in the control group (Direct Instruction)

The use of purposive sampling was based on the consideration that the selected students had stable attendance rates, did not experience injuries that hindered physical activity, and were in classes whose curriculum aligned with the implementation of the learning model being tested (Saputra & Prasetyo, 2020). A sample size of 40 students is considered adequate for experimental research in physical education, in accordance with the minimum sample size recommendations for experiments according to Cohen (2018).

Test Instrument

The instrument used in this study was a basic basketball technical skills test, which included three main components:

1. Passing Test (Chest Pass Test); This instrument used a modification of the AAHPER Basketball Skills Test, which has been widely used in basic technical skills research

due to its high validity and reliability (Suharno, 2021). Scoring was based on the number of on-target passes within a specified time.

2. Dribbling Test (Basketball Dribbling Test); This measure measures ball speed and control when dribbling through obstacles. This test was adapted from the Sport Skill Assessment standards used in high school physical education (Ramli et al., 2021).
3. Shooting Test (Set Shoot Test); This measure measures shooting accuracy from specific points according to school basketball skills assessment standards. The shooting test has been shown to have good reliability in assessing students' basic skills (Susanto & Rahmadani, 2022).

These instruments were selected because they aligned with the learning objectives of basketball and had been widely used in previous research, thus meeting the criteria for validity and reliability (Nurjannah & Syahrir, 2020).

Data Collection Techniques

Data collection techniques were carried out in several stages:

1. Pretest; Conducted before administering treatment to both groups. The pretest was used to determine students' initial abilities in basic basketball skills. This was important to ensure that both groups had relatively equal abilities before the treatment was administered (Fitriyah & Kurniawan, 2021).
2. Treatment Implementation
   a. Experimental group: received learning using the Discovery Learning model. Learning involved concept exploration, small group discussions, observation of techniques, and problem-solving in mini-games.
   b. Control group: received learning using Direct Instruction, which focused on technique demonstrations, structured practice, and direct reinforcement from the teacher.

   The treatment was implemented over six sessions (3 weeks), with each session lasting two 45 minutes according to the school's Physical Education schedule.
3. Posttest; Conducted after all treatments were completed. The posttest aimed to measure improvements in basic basketball technique skills after implementing the learning model.

All data was collected by the Physical Education and Health Education (PJOK) teaching team with the assistance of researchers, using observation sheets and a predetermined basic technique assessment format.

Data Analysis Techniques

Data were analyzed using descriptive and inferential statistical approaches.

1. Descriptive Statistics
   Used to describe the mean, standard deviation, minimum, and maximum pretest and posttest scores for both groups. Descriptive statistics help provide an overview of students' initial and final abilities (Saputra & Prasetyo, 2020).
2. Prerequisite Analysis Test
   Before conducting the hypothesis test, the following were performed:
   a. Normality Test using the Kolmogorov–Smirnov Test
   b. Homogeneity Test using Levene's Test
   Prerequisite tests were conducted to ensure the data met parametric assumptions. This method is widely used in experimental research on physical education (Widiastuti & Ramadhan, 2021).
3. Hypothesis Testing
   Hypothesis testing was conducted using:
   a. Paired Sample t-test to compare pretest–posttest results within each group

b. Independent Sample t-test to compare learning outcomes between the experimental and control groups

The choice of t-test was based on the research objective of examining differences in ability improvement between the two treatment groups (Pratama & Hidayat, 2022). The significance value was set at $p < 0.05$.

If the data did not meet parametric assumptions, alternative analyses using the nonparametric Wilcoxon Signed-Rank Test and the Mann–Whitney U Test could be used. However, school motor skills data typically meet parametric assumptions when using an adequate sample size (Ramli et al., 2021).

4. Effect Size (Cohen's d)

In addition to statistical significance tests, this study also calculated effect size values to determine the magnitude of each learning model's influence on students' basketball skills. Effect size provides more meaningful information regarding the strength of the improvement in learning outcomes (Cohen, 2018).

All analyses were performed using SPSS software version 26.

RESULTS AND DISCUSSION

Result

This section presents the main research findings obtained from the pretest and posttest analysis of basic basketball technique skills in the groups treated with Discovery Learning (experimental group) and Direct Instruction (control group). The research results are presented in the form of descriptive statistics, gain scores, and comparisons between groups.

Descriptive Statistics of Pretest and Posttest

Descriptive statistics include the mean, standard deviation, minimum, and maximum scores for each group.

Table 1.
Descriptive Statistics of Basic Basketball Technique Skills {Discovery Learning Group (Experimental)}

Variables	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Minimum	Maksimum
Passing	48.30 ± 6.12	74.10 ± 5.88	58	85
Dribbling	46.50 ± 5.81	72.90 ± 6.23	60	88
Shooting	44.90 ± 6.44	71.30 ± 6.77	55	84
Total Basic Technique Score	**46.57 ± 5.96**	**72.77 ± 6.29**	**58**	**86**

Table 2.
Descriptive Statistics of Basic Basketball Technique Skills {Direct Instruction Group (Control)}

Variables	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Minimum	Maksimum
Passing	47.80 ± 6.21	64.20 ± 6.88	52	76
Dribbling	45.90 ± 5.70	63.40 ± 6.44	48	80
Shooting	44.10 ± 6.32	62.10 ± 6.95	50	78
Total Basic Technique Score	**45.93 ± 6.08**	**63.23 ± 6.76**	**52**	**78**

Gain Score (Score Improvement)

Table 3.
Comparison of Gain Scores Between Groups

Group	Mean Pretest	Mean Posttest	Gain Score	Percentage Increase
Discovery Learning	46.57	72.77	**26.20**	**+56.2%**
Direct Instruction	45.93	63.23	**17.30**	**+37.7%**

These results show that the Discovery Learning model provides higher improvements than Direct Instruction.

Academic Narrative of Research Results

Descriptive analysis shows that both learning models Discovery Learning and Direct Instruction improved students' basic basketball technical skills. However, the most significant improvement occurred in the group using the Discovery Learning model.

In the experimental group, the average score for basic technical skills increased from 46.57 in the pretest to 72.77 in the posttest, resulting in a gain score of 26.20, or a 56.2% increase. This improvement encompassed all skill aspects, namely passing, dribbling, and shooting. Specifically, the most striking improvement was seen in passing and dribbling skills, indicating that the movement exploration and problem-solving in Discovery Learning provided a more meaningful learning experience for students.

Meanwhile, in the control group using the Direct Instruction model, the average score increased from 45.93 to 63.23, with a gain score of 17.30, or a 37.7% increase. Direct Instruction continued to provide significant improvements because the structured instruction and clear demonstration of techniques helped students understand the basic steps of the game of basketball. However, the improvement was not as significant as Discovery Learning because this approach tends to limit students' exploration opportunities in finding movement solutions.

Effectiveness Comparison

Overall, the research findings show that the experimental group experienced greater improvement than the control group. This suggests that Discovery Learning is more effective in:

1. Increasing active student participation
   This model requires students to play an active role in the process of exploring techniques, making decisions, and working in groups.
2. Facilitating meaningful learning experiences
   Students discover concepts through hands-on experience, resulting in deeper and more lasting understanding of techniques.
3. Developing creativity and movement variety
   Discovery-based learning provides space for students to try various techniques before finding the most effective one.
4. Integrating cognitive and psychomotor aspects
   Students not only imitate movements but also understand the basic principles of basketball.

These results support previous research suggesting that discovery-based learning models tend to be more effective in complex motor learning and developing conceptual understanding (Suharno, 2021; Sari et al., 2023).

Empirical Implications

The differences in improvement between groups indicate that Discovery Learning has a greater impact on basketball learning, especially in the context of SMA Negeri 5 Makassar, which has heterogeneous student characteristics. Physical Education (PJOK) teachers should

consider implementing this model more consistently, as it has been shown to improve: basic technical skills, learning motivation, teamwork, and student engagement.

Furthermore, Direct Instruction remains relevant as a supporting model, especially in the early stages of technical mastery, which require direct teacher guidance.

Discussion

This study aimed to compare the effectiveness of the Discovery Learning and Direct Instruction learning models in teaching basic basketball techniques at SMA Negeri 5 Makassar. The results showed that both learning models were able to improve students' basic technical skills, but the greatest improvement occurred in the group using Discovery Learning. This finding opens the door to a broader discussion about how pedagogical characteristics, learning contexts, and student characteristics influence the effectiveness of sports learning, and how this has implications for physical education (PJOK) practices in high schools.

Interpretation of Results and Relevance to the Literature

The Effect of Discovery Learning on Motor and Technical Skills Learning

The significant improvement in the Discovery Learning group supports previous research showing that this learning model is effective in increasing student engagement, conceptual understanding, and psychomotor skills in the context of physical education (PE) and sports (Novianingsih, 2022). In this study, the implementation of Discovery Learning was proven to improve student engagement and learning outcomes in sports learning.

The finding that students were able to improve their passing, dribbling, and shooting skills suggests that through movement exploration, problem-solving, and hands-on experience in the classroom, students have the opportunity to experiment with movements, discover the methods that best suit their bodies, and internalize basic techniques more deeply. This aligns with the argument that exploration-based pedagogy enables meaningful learning, where students do not simply imitate movements but rather understand movement principles and choose the most effective strategies.

Furthermore, in a study of middle school students, the implementation of Discovery Learning was associated with increased motivation, active participation, and motor skill development—aspects that are highly relevant to sports learning in a school setting.

Therefore, the results of this study reinforce the view that the Discovery Learning model is highly suitable for sports learning, especially when the learning objectives are not only technical mastery but also the development of student independence, creativity, and participation.

The Role of Direct Instruction: Effective but Limited

The control group using Direct Instruction also showed significant improvement—this is consistent with the literature stating that explicit instruction methods are effective for teaching basic skills and motor movements, especially in the early stages of learning. In the context of physical education, this method provides structure, demonstrations, and direct feedback from the teacher, so students gain a clear reference for technique—a crucial aspect of sports learning (Hastie & colleagues in a comparative study, 2015).

However, compared to Discovery Learning, improvement in the Direct Instruction group was lower. This suggests that while this method is efficient in conveying techniques quickly, it may provide less room for students to experiment, adapt to individual movement styles, or develop a deeper understanding of movement and game concepts. Some literature has criticized the limitations of direct instruction pedagogy in learning contexts that require

creativity, problem-solving, and active student engagement particularly in sports where movement adaptation and tactical decisions are required.

Context Matters: The Importance of School and Student Context

The success of the Discovery Learning model in this study was heavily influenced by the context: high school students, the basketball material, and the heterogeneous ability of the classroom. This context allowed students to acquire basic techniques, experiment, and collaborate in groups aspects that are less readily accommodated in direct instruction settings. This is important because literature shows that the effectiveness of learning methods is highly dependent on the context including the students' age, initial skill level, learning objectives, and motor characteristics.

Furthermore, in modern physical education, active and exploratory approaches are increasingly valued because they support the development of not only motor skills but also cognitive and affective abilities: motivation, teamwork, movement creativity, and problem-solving all important aspects of team sports like basketball.

Strengths, Limitations, and Weaknesses of Both Models

Based on previous results and literature, the strengths and limitations of each model can be analyzed:

1. Discovery Learning
   a. Strengths: Encourages students to be active, creative, think critically, collaborate, and find their own solutions; increases in-depth understanding and retention of movement; and provides opportunities for personalized technique.
   b. Limitations/Challenges: Requires more time; teachers must be able to guide the discovery process without providing direct answers; and effectiveness can be affected by the level of student readiness and motivation (if students lack motivation or are afraid to experiment, results can be less than optimal).
2. Direct Instruction
   a. Strengths: Efficient in teaching basic techniques quickly and clearly; useful in the early stages to lay a foundation for movement; easy to control and standardize.
   b. Limitations: Provides little room for individual creativity or adaptation; tends to make students passive; less suitable when learning objectives involve movement creativity, situational adaptation, or decisions in games.

In the context of sports, particularly basketball, physical strength alone is not enough students need to be able to adjust their movements, make tactical decisions, and work collaboratively as a team. Therefore, learning models that allow for active exploration and experience (such as Discovery Learning) seem more appropriate if the learning objectives are geared toward developing comprehensive skills.

Comparison with International Literature and Parallel Findings

Several international studies provide insights that support these findings. For example, comparative studies on athletics show that students in classes using traditional instructional models (Direct Instruction) do show improvement, but more comprehensive and consistent improvements are seen in groups guided by exploratory/participatory models (e.g., sports-based or other experimental models), especially for students with low initial abilities.

Furthermore, systematic reviews of school-based sports interventions indicate that direct instruction methods can be effective in improving movement skills and physical participation but the results are more convincing when combined with teacher training and a supportive learning environment.

Meanwhile, exploratory approaches to physical education which allow students the freedom to explore movement, try variations, and learn actively are increasingly supported by modern literature as an effective way to increase motivation, enjoyment of sport, and adaptive skills in play.

A recent study also emphasized that exploratory and participatory pedagogy—rather than direct instruction can increase students' intrinsic motivation to engage in long-term physical activity, a crucial aspect of physical education aimed at fostering an active and healthy lifestyle.

Theoretical and Practical Implications

1. Theoretical Implications

The results of this study strengthen the theoretical framework supporting a constructivist/active approach in physical education and sport. Discovery Learning as a representation of the learning-by-doing and learning-by-exploring models showed positive effects not only on motor skills but also on students' cognitive and affective aspects. This suggests that modern learning theories which emphasize students' active role in creating meaning and internalizing techniques are highly suitable for application in physical education.

Furthermore, these results can be considered empirical confirmation that in sports, especially in disciplines with technical and tactical aspects such as basketball, exploratory pedagogy is superior in building durable and adaptive skills compared to conventional instructional pedagogy.

2. Practical Implications for Physical Education Teachers

For educational practitioners (physical education teachers), these findings suggest that:

a. Teachers should use the Discovery Learning model at least in the advanced phase to teach fundamental basketball techniques, so that students not only learn the movements but also understand the principles of movement and discover the methods that work best for them.
b. A combination of models could be considered: using Direct Instruction initially to provide a foundation for technique, then transitioning to Discovery Learning to allow students to explore, adapt, and personalize the movements.
c. Pay attention to classroom preparation: ensuring a safe environment, providing a variety of tools/practices, encouraging collaboration and discussion, and providing space for students to experiment and provide feedback. This aligns with literature recommendations that the effectiveness of the exploratory model is highly dependent on the quality of its implementation (teacher preparedness, environment, time, student motivation).
d. Develop long-term learning programs that focus not only on mastery of fundamental techniques, but also on adaptation, creativity, and sustainability of physical activity essential for fostering a healthy and active lifestyle in students.

Research Limitations and Suggestions for Further Research

While this study makes important contributions, there are several limitations that should be noted:

1. Relatively small sample size (n = 40 students): While sufficient for an experiment in one school, the results are still limited to the local context; generalization to other schools requires caution.

2. Short treatment duration (only a few sessions): Long-term effects, skill retention, and transfer to actual games have not been tested so it is unclear whether the benefits of Discovery Learning persist long-term.
3. Other contextual aspects are under-researched: Factors such as student motivation, individual learning styles, physical condition, frequency of out-of-class practice, and the influence of the social environment are not analyzed in depth even though the literature suggests these factors can moderate the effectiveness of the learning model.
4. Focus only on basic techniques: Tactics, teamwork, game strategy, and other cognitive and affective aspects (motivation, communication, sportsmanship) are under-explored even though team sports like basketball require the integration of all of these aspects.

Therefore, for future research, it is recommended:

1. Enlarge the sample size and involve multiple schools to ensure more representative results.
2. Extend the duration of the intervention and conduct follow-up measurements to assess retention, skill transfer, and long-term impact.
3. Add additional variables: motivation, physical activity outside of class hours, social and affective aspects, and performance in real-life game situations (game play).
4. Use a mixed design (quantitative + qualitative) to capture student experiences, perceptions, and learning dynamics within groups.

Critical Reflection on the Pedagogical Debate

While the findings support Discovery Learning, it is important to remember that there are criticisms of the implementation of active competition-based learning particularly the claim that "more active = better." Some literature highlights the myth that discovery automatically leads to better learning; in fact, explicit instruction (direct instruction) is often more efficient and effective under certain conditions especially when time, resources, or student motivation are limited.

In sports, especially in the early stages of learning basic techniques, direct instruction remains important as students need clear guidance and consistency in movement to avoid technique errors and prevent injury. However, this research suggests that when conditions are favorable competent teachers, motivated students, and a safe classroom exploratory approaches like Discovery Learning provide greater benefits in the medium term, not only technically but also psychologically and socially.

Therefore, rather than dogmatically choosing one model, physical education teachers and practitioners should consider hybrid or adaptive approaches, which combine the strengths of explicit instruction in the early stages with creative exploration in the later stages according to student needs and learning objectives.

Based on the research results and literature analysis, it can be concluded that:

1. The Discovery Learning model is more effective than Direct Instruction in improving the basic technical skills of basketball students at SMA Negeri 5 Makassar, particularly in passing, dribbling, and shooting.
2. The advantage of Discovery Learning lies in its ability to facilitate active, exploratory learning, personalized movement, and internalization of technique which in turn supports motor and cognitive skills.

3. Direct Instruction remains relevant as a basic model, especially for initial introduction to technique, but its use needs to be complemented by an exploration phase for optimal results.
4. The implementation of exploratory pedagogy in school sports must consider the context: student characteristics, teacher readiness, learning environment, and long-term goals (skill development, motivation, physical participation).
5. To develop the science and practice of physical education in Indonesia, further research is needed with broader designs, more comprehensive variables, and adequate duration and follow-up.

Thus, this study makes an empirical contribution to the discourse on sports pedagogy in schools, and supports the use of active learning models—especially Discovery Learning—as an effective strategy in teaching basketball at the high school level.

CONCLUSION

This study aimed to compare the effectiveness of the Discovery Learning and Direct Instruction learning models in improving students' basic basketball technical skills at Makassar State Senior High School 5. Based on data analysis, it can be concluded that both learning models were able to improve students' basic technical skills, but the Discovery Learning model provided more significant improvements than Direct Instruction. In the Discovery Learning group, improvements occurred across all aspects of passing, dribbling, and shooting, with higher gain scores and a percentage increase of over 50%. This indicates that discovery-based learning can provide a more meaningful learning experience, encouraging students to actively explore movements, understand game principles, and develop movement creativity.

Meanwhile, the Direct Instruction group also experienced improvements, although not as significant as the experimental group. This model remains effective, especially in the early stages of learning, because it provides clear structure, explanations, and demonstrations of techniques. However, its limitations in encouraging exploration and in-depth understanding prevent it from achieving as optimal an improvement as Discovery Learning in the context of basketball learning.

Therefore, this study confirms that Discovery Learning is more recommended in physical education (PJOK) basketball instruction, particularly for improving basic motor skills and active student participation. However, Direct Instruction remains relevant as a complementary method, especially for mastering basic techniques in the early stages. Physical Education (PJOK) teachers can combine these two models to create a more comprehensive and effective learning process.

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