Students' Perceptions of Understanding Basketball Skills and Concepts in Physical Education: A Case Study at Al Azhar 02 Tekraf Vocational School

By Dhika Bayu Mahardhika

WORD COUNT 6146
TIME SUBMITTED 16-APR-2026 08:17AM
PAPER ID 121174690

IJPESS
Indonesian Journal of Physical Education and Sport Science
p-ISSN 2775-765X | e-ISSN 2776-0200
Volume 6, No. 1, March 2026. Page. x-xx
http://journal.unucirebon.ac.id/index.php ijpess

Students' Perceptions of Understanding Basketball Skills and Concepts in Physical Education: A Case Study at Al Azhar 02 Tekraf Vocational School

Dhika Bayu Mahardhika[1*], Tedi Purbangkara[2], Dikdik Fauzi Dermawan[3], Alam Hadi Kosasih[4], Bela Santika[5]

[1,2,3]Physical Education, Health and Recreation Study Program, Faculty of Teacher Training and Education, Singaperbangsa University, Karawang, West Java Province, Indonesia

[4]Sports Education Study Program, Faculty of Islamic Education and Teacher Training, Garut University, West Java Province, Indonesia

[5]Physical Education, Health and Recreation Study Program, STKIP Purwakarta, West Java Province, Indonesia

*Corresponding Author: Dhika Bayu Mahardhika , e-mail:

dhika.bayumahardhika@fkip.unsika.ac.id

Abstract

Study Purpose. This study aims to analyze students' perceptions of their understanding of basketball learning at Al Azhar 02 Tekraf Vocational School, with attention to how teaching methods, learning environment, and instructional strategies shape students' comprehension and engagement.

Materials and Methods. This study employed a descriptive quantitative design. The population consisted of students of Al Azhar 02 Tekraf Vocational School who participated in basketball learning during the second semester of the 2024–2025 academic year. Using purposive sampling, 60 students with direct experience in basketball classes were selected as respondents. Data were collected using a structured questionnaire based on a five-point Likert scale to assess students' perceived understanding, motivation, and learning experiences in basketball learning. The instrument was reviewed through expert validation and refined through pilot testing prior to its administration. The data were analyzed using descriptive statistics, including frequencies, percentages, mean scores, and standard deviations, to identify patterns and trends in students' perceptions.

Results. Results: Students generally reported positive perceptions of learning basketball. 1) They appreciated clear teacher explanations, demonstrations, and opportunities for active practice. 2) Emotional support, peer collaboration, and 3) Adequate facilities were also perceived as enhancing motivation and participation. However, although students felt confident in performing physical skills, some reported difficulty understanding complex game strategies, indicating gaps in cognitive and tactical understanding.

Conclusions. Effective teaching methods, interactive learning environments, and supportive teacher peer relationships contribute to stronger student

understanding and enjoyment of basketball learning. Strengthening cognitive instruction especially on tactics and game strategy may further improve learning outcomes in vocational school physical education contexts.

Keywords: Students' perceptions, Basketball skills, Conceptual understanding, Physical education, Vocational school

DOI: https://doi.org/10.52188/ijpess.v3i1

Introduction

Basketball is one of the most popular sports in the world, combining physical endurance, strategy, and teamwork (Isnaini et al., 2026; Juditya et al., 2021). In the context of education, basketball serves not only as a competitive sport but also as a learning medium that promotes holistic student development (Özbalta et al., 2022). It helps students build coordination, discipline, and cooperation through structured physical activities (Naheria et al., 2021; Yahya & Katea, 2026). At the school level, basketball learning is an essential part of physical education programs designed to foster active lifestyles (Tsai et al., 2021). By engaging in basketball lessons, students develop both physical and social competencies (Zuo & Su, 2022). Understanding how students perceive this learning process is vital for educational improvement (Wu et al., 2023).

Perception plays a crucial role in shaping how individuals interpret learning experiences (Haïdara et al., 2023). In the classroom, students' perception influences their motivation, attention, and overall engagement toward the learning material (Olteanu et al., 2023). When students have positive perceptions, they tend to participate more actively and achieve better outcomes (Kurniawan et al., 2024). Conversely, negative perceptions may lead to disengagement and poor performance (Putra et al., 2024). In the context of basketball learning, students' perception determines how effectively they absorb technical and conceptual knowledge (Mguidich et al., 2025). Therefore, studying students' perceptions provides insight into the success of teaching strategies and learning environments.

At Al Azhar 02 Tekraf Vocational School, basketball learning is included as a key component of the physical education curriculum. The program aims to enhance students' physical fitness and sportsmanship through structured practice and guided instruction. However, as students at vocational schools often have diverse academic and practical orientations, their perceptions of sports learning can vary (Taborri et al., 2021). Some may view basketball as an enjoyable form of exercise, while others may see it as a secondary activity. This diversity makes it essential to understand how basketball learning is perceived and internalized by students (Coves et al., 2020; Irawati & Aziz, 2025).

Physical education teachers at Al Azhar 02 Tekraf Vocational School are expected to deliver basketball lessons that balance theory and practice. The learning process typically includes warm-up activities, skill drills, and mini-games that simulate real competitions. However, students' understanding of the purpose and objectives of these activities can differ. Some might focus solely on performance, while others value teamwork and learning experiences (Bu, 2023). By examining students' perceptions, teachers can better assess whether their instructional strategies align with students' needs and expectations in learning basketball (Koh et al., 2021).

The process of learning basketball involves not only physical skill development but also cognitive understanding. Students must learn to interpret game rules, strategies, and techniques accurately (Sarlis & Tjortjis, 2020). The teacher's role is to ensure that students grasp these aspects while maintaining motivation and enthusiasm. Teaching methods that emphasize active participation and demonstration are often more effective in sports learning

(C. Yang et al., 2021). However, without proper feedback or engagement, students may struggle to understand core concepts. This research aims to identify how students perceive these teaching and learning processes (Gamero et al., 2021a).

In modern education, physical education has evolved to focus on holistic learning outcomes that include cognitive, affective, and psychomotor domains (Faozi et al., 2024). Basketball, as a subject within this framework, must therefore encourage critical thinking and social interaction alongside physical performance (Hu et al., 2021). Understanding how students perceive basketball learning provides valuable insight into whether such goals are being achieved. Students perceptions can indicate whether the lessons are engaging, relevant, and meaningful (Reis et al., 2021). These perceptions also reflect the effectiveness of the teacher's instructional design and classroom management.

Several factors may influence students' perception of basketball learning (Susanto et al., 2023). These include the quality of teaching methods, the learning environment, peer interactions, and the availability of facilities (Azhar et al., 2021). A well-organized basketball court and adequate equipment can increase students' enthusiasm and comfort during practice (Li & Zhang, 2021). Similarly, a teacher's communication style and feedback approach can shape how students view their learning experiences. If these elements are effectively combined, students are more likely to develop positive perceptions. Therefore, examining these factors is necessary for improving learning quality (Reis et al., 2021).

Vocational schools such as Al Azhar 02 Tekraf have unique educational characteristics compared to general high schools. Their students often emphasize practical learning and hands-on experiences rather than purely theoretical studies (Susanto et al., 2023). Consequently, physical education programs must adapt to these learning preferences by incorporating engaging and activity-based lessons (Azhar et al., 2021). Basketball, as a dynamic and interactive sport, fits well within this approach. However, the effectiveness of basketball teaching in vocational contexts depends on students' perceptions of its relevance and usefulness. This research explores those perceptions in detail.

A positive perception toward basketball learning can contribute to higher motivation and better performance among students (Li & Zhang, 2021). When learners feel that the lessons are meaningful and enjoyable, they are more likely to participate actively and improve their skills (Nopembri et al., 2022). On the other hand, if students perceive the lessons as difficult or irrelevant, their engagement may decline. Teachers need to understand these differences in perception to tailor their approaches. Evaluating students' responses to basketball learning activities can thus serve as a reflection of the teaching process itself.

In sports education, perception is often linked to emotional and social factors (Nur & Malik, 2021). Students who feel supported and encouraged by their peers and teachers are more likely to express positive attitudes toward learning. The role of collaboration and teamwork in basketball further strengthens this connection (Gamero et al., 2021b). When the learning environment fosters inclusivity and respect, students tend to perceive basketball as both enjoyable and educational. This study investigates how such social elements contribute to students' overall perception and understanding of basketball learning (Shi, 2024).

Another aspect influencing students' perception is the clarity of instruction provided by teachers (Waffak et al., 2022). When teachers explain concepts, techniques, and game strategies clearly, students gain confidence and understanding. Demonstrations and real-time feedback are especially important in skill-based learning such as basketball (Meirizal et al., 2023). Miscommunication or unclear guidance, on the other hand, may create confusion and reduce learning effectiveness. The present study examines whether students at Al Azhar 02 Tekraf Vocational School find their teachers' explanations and demonstrations clear and helpful in mastering basketball concepts.

Technological advancements have also influenced physical education, including basketball learning (X. Chen et al., 2022). The use of video demonstrations, motion analysis, and digital tools helps students visualize techniques more effectively (L. Chen & Wang, 2020). However, students' readiness and perception of these innovations vary. Some may find technology helpful, while others may prefer traditional practice-based methods (F. Yang et al., 2022). This research seeks to determine whether the integration of technology enhances or hinders students understanding The findings can help educators design more adaptive and effective basketball learning approaches in the digital era.

The study of students' perception is not only about evaluating satisfaction but also about improving educational quality (Fan et al., 2021). When teachers understand how students perceive their lessons, they can modify instructional strategies to meet learning objectives more effectively. The insights gained from perception studies can also inform curriculum development and professional training for educators. At Al Azhar 02 Tekraf Vocational School, understanding student feedback about basketball learning is essential for strengthening physical education programs. This research contributes to that ongoing improvement process.

Previous studies have shown that positive perceptions of sports learning are correlated with increased self-confidence, teamwork, and persistence among students. In basketball, where collaboration and communication are crucial, these outcomes are particularly relevant (Yao, 2021). Therefore, identifying how students perceive their basketball learning can reveal important psychological and educational dynamics (Su & Chen, 2022). The findings of this study are expected to support teachers in fostering motivation, participation, and mutual respect. Ultimately, perception becomes both an outcome and a driver of effective learning (Das & Islam, 2021).

In summary, the introduction of this research highlights the importance of understanding students' perception in the context of basketball learning. At Al Azhar 02 Tekraf Vocational School, where vocational and academic elements coexist, this study aims to explore how students interpret and value their learning experiences. The results are expected to provide a comprehensive picture of how teaching methods, learning environments, and engagement affect understanding. By analyzing these perceptions, educators can develop more effective and inclusive basketball learning strategies. This study thus serves as a foundation for enhancing physical education practices in vocational settings.

The novelty of this study lies in its emphasis on students' perceptions of basketball learning within a vocational school setting, an area that has received limited attention in previous research. While earlier studies have mainly explored perceptions of physical education in general contexts, this study specifically examines basketball learning at Al Azhar 02 Tekraf Vocational School, where students' practical learning orientation may shape how they understand, value, and engage in sports instruction. By focusing on this context, the study provides a more specific contribution to the literature on physical education by highlighting how teaching methods, learning environment, and student engagement interact in vocational-based basketball learning.

Materials and methods

Study participants

This study involved students of Al Azhar 02 Tekraf Vocational School who actively participated in basketball learning as part of the physical education curriculum. The population comprised all students engaged in basketball lessons during the 2024–2025 academic year (second semester). A purposive sampling technique was applied to ensure that only students with direct experience in basketball learning were included. A total of 60 students were selected as respondents, representing different grades and departments to

capture diverse perspectives and levels of experience. Prior to data collection, permission was obtained from the school, and participants were informed about the study purpose and confidentiality of their responses (Sugiyono, 2017).

Study organization

This research employed a descriptive quantitative design aimed at describing students' perceptions of their understanding of basketball learning without manipulating variables. Data were gathered using a structured questionnaire developed to measure multiple dimensions of students' perceptions, including teaching methods, learning environment, student engagement, and comprehension of basketball concepts and skills. Questionnaire responses were recorded using a Likert scale ranging from "Strongly Agree" to "Strongly Disagree."Before the main data collection, the questionnaire underwent expert validation by specialists in physical education and educational research to ensure content relevance and clarity. A pilot test was also conducted on a small group of students outside the main sample to evaluate reliability and identify ambiguous items. After refinement, the final questionnaire was administered during physical education sessions. Students received clear instructions and were encouraged to respond honestly based on their experiences. Completed questionnaires were collected on the same day to maintain a high response rate. All data were handled confidentially and used solely for research purposes.

Statistical analysis

Data were checked for completeness and then coded according to the Likert scale scoring system. Responses were entered into a spreadsheet/statistical program for analysis. Descriptive statistical techniques were used to summarize students' perceptions, including frequencies, percentages, mean scores, and standard deviations. Results were presented using tables and/or graphs to clearly describe patterns and trends in students' perceptions regarding basketball learning at Al Azhar 02 Tekraf Vocational School.

Result

This section presents the findings from 60 students of Al Azhar 02 Tekraf Vocational School who participated in basketball learning activities. Data were obtained using a structured questionnaire consisting of 20 items representing four indicators: teaching method, learning environment, student engagement, and comprehension of basketball concepts. All items were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Descriptive statistics (mean, standard deviation, and percentages) were used to summarize students' perceptions.

The descriptive analysis showed that students' overall perceptions of basketball learning were high. The overall mean score was 4.15 (SD = 0.46), indicating that students generally experienced basketball lessons positively and consistently. Table 1 summarizes the perception scores across the four indicators.

Table 1. Students' Perception toward Basketball Learning

No	Indicator	Mean	Std. Deviation	Category
1	Teaching Method	4.18	0.52	High
2	Learning Environment	4.10	0.48	High
3	Student Engagement	4.12	0.45	High
4	Comprehension of Basketball Concepts	4.20	0.39	Very High
—	Overall Mean Score	4.15	0.46	High

As shown in Table 1, the highest mean score was found for Comprehension of Basketball Concepts (M = 4.20; SD = 0.39), followed by Teaching Method (M = 4.18; SD = 0.52) and Student Engagement (M = 4.12; SD = 0.45). The Learning Environment indicator (M = 4.10; SD = 0.48) showed the lowest mean score, although it remained within the high category. Overall, these results indicate consistently positive perceptions across all measured aspects in Table 2.

Table 2. Comparison of Students' Perception Scores per Indicator

No	Indicator	Mean	Std. Deviation	Category	Interpretation
1	Teaching Method	4.18	0.52	High	The teacher's instructional approach was perceived as effective and engaging.
2	Learning Environment	4.10	0.48	High	Facilities and atmosphere were supportive, though minor limitations existed.
3	Student Engagement	4.12	0.45	High	Students showed strong enthusiasm and active participation during activities.
4	Comprehension of Basketball Concepts	4.20	0.39	Very High	Students demonstrated deep understanding of basketball rules and techniques.
—	Overall Mean Score	4.15	0.46	High	Students' overall perception of basketball learning was positive and consistent.

Teaching clarity and instructional approach

Students reported very positive perceptions regarding teaching clarity and instructional strategies. Table 3 shows that the mean scores for all statements were in the high to very high

categories, with an average mean of 4.72, indicating that students strongly valued clarity of explanation, demonstration-based instruction, practice opportunities, feedback, and teacher motivation.

Table 3. Students' Responses toward Teaching Clarity and Instructional Approach

No	Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean	Category
1	The teacher gives clear explanations during basketball lessons.	85	10	3	2	0	4.78	Very High
2	The use of demonstration helps me understand basketball techniques.	80	15	4	1	0	4.74	Very High
3	The teacher provides enough practice opportunities for each student.	78	17	3	2	0	4.71	Very High
4	The teacher gives feedback that helps me improve my basketball skills.	75	18	5	2	0	4.66	High
5	The teacher motivates students to participate actively in each session.	82	13	3	2	0	4.73	Very High
—	**Average Mean**	—	—	—	—	—		

Score

Response distribution further showed that 85% of students strongly agreed that the teacher provided clear explanations, 80% reported that demonstrations improved understanding, and 78% indicated sufficient practice opportunities. Only a small proportion of students expressed neutral or negative responses, reinforcing that the instructional approach was perceived as structured and supportive.

Learning environment and facilities

The learning environment was evaluated positively (M = 4.10), indicating that students generally considered facilities and court conditions supportive. Approximately 83% of respondents agreed that equipment and space were adequate; however, around 12% reported that limited availability of basketballs occasionally reduced practice efficiency. This suggests that the learning environment contributed positively to learning, although minor logistical constraints may still require attention.

Figure 1 compares average perception scores across two aspects: Teaching Clarity and Instructional Approach and Learning Environment and Facilities. Perceptions of teacher instruction were in the very high category, whereas perceptions related to facilities and environment were also positive but slightly lower.

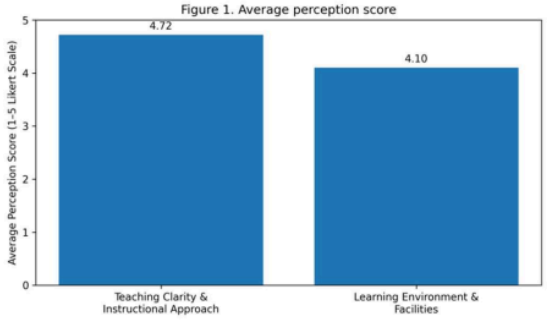

Figure 1. Average perception score

Student engagement

Student engagement was rated positively (M = 4.12). Most students reported active involvement during lessons, with 82% indicating strong participation and consistent collaboration during learning activities. Only a small proportion (approximately 6%) reported being less involved, mainly due to physical limitations or personal preferences. Overall, engagement levels were considered high, reflecting that basketball learning activities encouraged participation and teamwork in Figure 2.

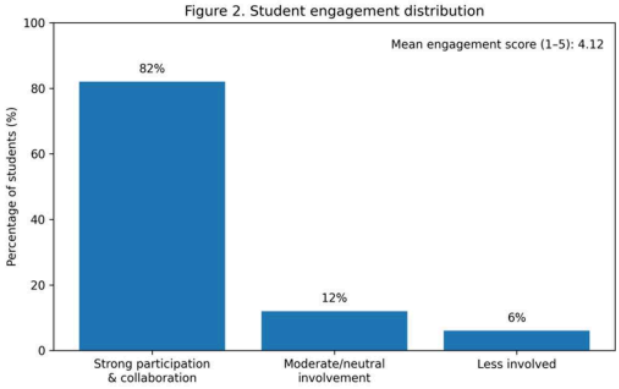

Figure 2. Student engagement distribution

Comprehension of basketball concepts

Comprehension of basketball concepts achieved the highest indicator score (M = 4.20; SD = 0.39). Students reported strong understanding of fundamental skills such as dribbling, shooting, and passing, along with awareness of rules, strategies, and fair play. Approximately 88% agreed that lessons improved tactical thinking and decision-making during games, suggesting that both practical and conceptual learning objectives were perceived as achieved.

Perceptions by gender and experience

When examined descriptively by gender, perceptions were similar across groups. The mean score for male students was 4.17, and for female students was 4.13, indicating minimal differences in perceived learning experience. Similarly, students' level of experience (beginner vs. advanced) did not appear to substantially influence perception, as both groups reported positive evaluations. These results suggest that the learning process was perceived as inclusive and consistently beneficial across student characteristics.

Overall distribution of enjoyment

Overall, 90% of students rated basketball learning as "very enjoyable" or "enjoyable." Only 7% provided neutral responses, and 3% expressed mild dissatisfaction. This distribution reinforces that basketball learning was perceived as meaningful and engaging by the majority of students, and that the instructional approach likely supported diverse abilities and interests in Figure 3.

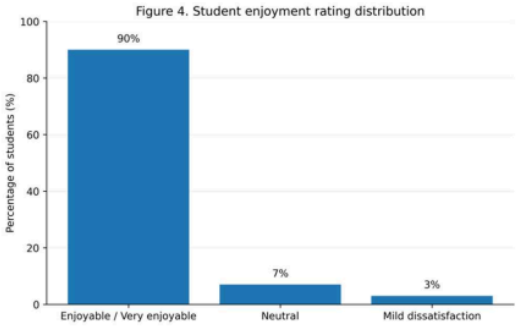

Figure 3. Students enjoyment rating distribution

Summary of findings

In summary, students reported high overall perceptions of basketball learning. All measured indicators teaching method, learning environment, student engagement, and comprehension achieved high to very high mean scores with relatively low variation, suggesting consistent positive experiences. These results provide a clear quantitative basis for discussing instructional implications in the next section.

Discussion

The findings suggest that students' positive perceptions of basketball learning are best understood as the outcome of instructional quality, supportive learning conditions, and meaningful participation opportunities rather than merely high scores on a questionnaire. In physical education, perception is closely linked to how students interpret competence, autonomy, and social support in the learning process; therefore, the patterns observed in this study can be interpreted as signals of a learning environment that supports both skill development and motivation.

Instructional clarity strengthens perceived competence and learning effectiveness

Students' strong endorsement of clear explanations, demonstrations, and feedback indicates that instruction was experienced as structured and understandable, which is critical in motor learning contexts where students must translate verbal information into coordinated movement (Shi, 2024). From a pedagogical perspective, demonstration functions as an external model that helps learners form accurate mental representations of movement, while feedback supports error detection and refinement. When these elements are consistently present, students are more likely to experience perceived competence, a key predictor of sustained engagement in physical education. This aligns with broader PE literature emphasizing that explicit instruction, modeling, and formative feedback are central mechanisms for improving both learning outcomes and confidence during skill acquisition.

Tactical understanding reflects learning beyond technique

The high rating for comprehension of basketball concepts and the large proportion of students reporting improved tactical thinking can be interpreted as evidence that learning extended beyond "how to execute" skills toward "how to apply" skills in game contexts (Waffak et al., 2022). Contemporary PE frameworks increasingly stress the importance of game understanding, decision-making, and strategic awareness alongside technique. When students perceive growth in tactical thinking, it typically indicates that instruction has provided opportunities to connect rules, strategies, and situational choices often achieved through guided play, small-sided games, or questioning approaches that prompt reflection. In other words, students' perceptions here suggest that basketball instruction likely supported a cognitive–motor integration, which is a hallmark of higher-quality sport pedagogy.

Engagement is likely driven by autonomy and social relatedness

High engagement and collaboration can be interpreted through motivational theory: students are more willing to participate when tasks feel meaningful, achievable, and socially supported. Basketball learning naturally involves cooperation and shared problem-solving, and students' positive engagement responses imply that the learning design may have allowed them to experience belonging and relatedness through teamwork (Adepoju et al., 2022). In PE, peer interaction also functions as a social motivator that can reduce anxiety and increase persistence, particularly when the class climate is supportive. The small minority reporting

low involvement suggests the need for pedagogical differentiation (e.g., adaptable roles and progressive task difficulty), which is consistent with inclusive PE recommendations aimed at ensuring students with different physical capacities remain engaged without lowering learning standards.

Facilities matter because they shape practice quality and equity

Although the learning environment was rated positively overall, its slightly lower evaluation can be interpreted as a reminder that facilities influence the *quality* of practice, not just comfort. Skill learning is sensitive to repetition and time-on-task; limited equipment can reduce practice frequency and increase waiting time, which can undermine engagement and perceived fairnessv (Anggraini et al., 2020; Bean et al., 2022). PE research commonly highlights that resource adequacy supports equitable participation because all students gain more chances to perform, receive feedback, and experience improvement. Therefore, improving logistical aspects (e.g., increasing ball availability or using station-based practice structures) is not simply an administrative issue it is a pedagogical strategy that increases active learning time and supports more consistent skill acquisition.

Enjoyment signals the sustainability of PE learning outcomes

The dominance of enjoyment responses is meaningful because enjoyment is widely recognized as a key driver of continued participation in physical activity and positive attitudes toward PE. When students report enjoyment, it often reflects a combination of competence experiences ("I can do it"), social satisfaction ("I feel supported"), and autonomy ("I can participate actively"), all of which contribute to intrinsic motivation (Ntoumanis & Standage, 2009). In vocational school settings, where students may prioritize practical and collaborative learning experiences, enjoyable PE lessons can play an important role in supporting well-being and encouraging lifelong sport participation. Thus, enjoyment in this study can be interpreted as an indicator of instructional sustainability the learning approach is not only effective but also likely to maintain students' willingness to engage.

Implications for practice

Pedagogically, these interpretations suggest several directions for strengthening basketball learning: (1) maintain explicit instruction, demonstration, and feedback routines to preserve perceived competence; (2) expand tactical learning through guided games and reflective questioning to deepen decision-making; (3) enhance inclusivity through differentiated tasks and roles so that all students remain involved; and (4) improve equipment management and practice organization to increase active learning time and equity.

Summary

Overall, the results can be interpreted as evidence that basketball learning at Al Azhar 02 Tekraf Vocational School provides students with a learning experience characterized by clarity, meaningful participation, and cognitive–motor development. The slightly lower perceptions of facilities highlight that strengthening resources and class organization can further optimize practice quality. These findings support current perspectives in physical education that effective sport learning emerges when technical instruction, tactical understanding, motivation, and supportive environments work together.

Conclusions

This study addressed the limited evidence on how vocational school students perceive their understanding of basketball learning by examining four key aspects: teaching method,

learning environment, student engagement, and comprehension of basketball concepts. Overall, students reported high perceptions of basketball learning (overall M = 4.15; SD = 0.46). The strongest perceived contributor was teaching clarity and instructional approach (average M = 4.72), followed by comprehension of basketball concepts (M = 4.20; SD = 0.39) and student engagement (M = 4.12). Most students also evaluated the learning experience as enjoyable (90%), indicating that basketball lessons were perceived as meaningful and motivating in this vocational school context. These findings contribute to physical education practice by highlighting that clear instruction, demonstration, feedback, and structured participation opportunities are perceived as central to effective and enjoyable basketball learning.

Several limitations should be noted. First, the study relied on self-reported perceptions, which may be influenced by response bias and do not directly represent actual performance or learning outcomes. Second, the design was descriptive and cross-sectional, limiting causal interpretation. Third, the sample involved one school with 60 students, which may restrict generalizability to other vocational schools or regions.

Future research should (1) combine perception data with objective measures (e.g., skill tests, tactical decision-making assessments, or systematic observation of engagement), (2) use comparative or experimental designs to evaluate specific instructional models (e.g., game-based or tactical approaches), and (3) involve larger and multi-site samples to strengthen external validity and provide broader recommendations for vocational school physical education.

Acknowledgment

The authors would like to express their sincere gratitude to the principal, physical education teachers, and students of Al Azhar 02 Tekraf Vocational School for their cooperation and participation during the data collection process. Appreciation is also extended to all parties who provided support and constructive input that contributed to the completion of this study.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

References

Adepoju, A. H., Austin-Gabriel, B., Eweje, A., & Collins, A. (2022). *Framework for Automating Multi-Team Workflows to Maximize Operational Efficiency and Minimize Redundant Data Handling*. *5*(9). https://www.irejournals.com/paper-details/1703282

Anggraini, S., Setyaningrum, W., Retnawati, H., & Marsigit. (2020). How to improve critical thinking skills and spatial reasoning with augmented reality in mathematics learning? *Journal of Physics: Conference Series*, *1581*(1), 012066. https://doi.org/10.1088/1742-6596/1581/1/012066

Azhar, T. A. N., Mulyaningsih, N. N., Saraswati, D. L., Nurhayati, N., Marliani, N., Nursa'Adah, F. P., Sari, N. I., Lestari, I., & Nurjanah, N. (2021). Video analysis of basketball throws for parabolic motion learning materials. *Journal of Physics: Conference Series*, *1816*(1). https://doi.org/10.1088/1742-6596/1816/1/012077

Bean, C., Kramers, S., & Harlow, M. (2022). Exploring life skills transfer processes in youth hockey and volleyball. *International Journal of Sport and Exercise Psychology*, *20*(1), 263–282. https://doi.org/10.1080/1612197X.2020.1819369

Bu, X. (2023). Exploration of Intelligent Coaching Systems: The Application of Artificial Intelligence in Basketball Training. In *Saudi Journal of Humanities and Social*

Sciences (Vol. 8, Issue 09, pp. 290–295). saudijournals.com. https://doi.org/10.36348/sjhss.2023.v08i09.007

Chen, L., & Wang, W. (2020). Analysis of technical features in basketball video based on deep learning algorithm. *Signal Processing: Image Communication*, *83*. https://doi.org/10.1016/j.image.2020.115786

Chen, X., Jiang, J. Y., Jin, K., Zhou, Y., Liu, M., Brantingham, P. J., & Wang, W. (2022). ReLiable: Offline Reinforcement Learning for Tactical Strategies in Professional Basketball Games. *International Conference on Information and Knowledge Management, Proceedings*, 3023–3032. https://doi.org/10.1145/3511808.3557105

Coves, A., Caballero, C., & Moreno, F. J. (2020). Relationship between kinematic variability and performance in basketball free-throw. *International Journal of Performance Analysis in Sport*, *20*(6), 931–941. https://doi.org/10.1080/24748668.2020.1820172

Das, R. K., & Islam, M. S. U. (2021). Application of artificial intelligence and machine learning in libraries: a systematic review. *arXiv preprint arXiv:2112.04573*.

Fan, J., Bi, S., Wang, G., Zhang, L., & Sun, S. (2021). Sensor fusion basketball shooting posture recognition system based on CNN. *Journal of Sensors*, *2021*. https://doi.org/10.1155/2021/6664776

Faozi, F., Dlis, F., Samsudin, S., Hambali, S., & Riyadi, D. N. (2024). Cooperative Learning Vs Direct Teaching in Basketball: Effects on Junior High School Students Basic Techniques. *International Journal of Disabilities Sports and Health Sciences*, *7*, 132–140. https://doi.org/10.33438/ijdshs.1371249

Gamero, M. G., García-Ceberino, J. M., Ibáñez, S. J., & Feu, S. (2021a). Analysis of declarative and procedural knowledge according to teaching method and experience in school basketball. In *Sustainability (Switzerland)* (Vol. 13, Issue 11). mdpi.com. https://doi.org/10.3390/su13116012

Gamero, M. G., García-Ceberino, J. M., Ibáñez, S. J., & Feu, S. (2021b). Influence of the pedagogical model and experience on the internal and external task load in school basketball. In *International Journal of Environmental Research and Public Health* (Vol. 18, Issue 22). mdpi.com. https://doi.org/10.3390/ijerph182211854

Haïdara, Y., Okilanda, A., Dewintha, R., & Suryadi, D. (2023). Analysis of Students' Basic Basketball Skills: A Comparative Study of Male and Female Students. *Tanjungpura Journal of Coaching Research*, *1*(1). https://doi.org/10.26418/tajor.v1i1.63796

Hu, G., Yang, H. C., & Xue, Y. (2021). Bayesian group learning for shot selection of professional basketball players. *Stat*, *10*(1). https://doi.org/10.1002/sta4.324

Irawati, A. F., & Aziz, M. I. M. (2025). The Role Of Upper And Lower Body Strength Balance On Three-Point And Free-Throw Accuracy In Collegiate Basketball Players. *Indonesian Journal of Physical Education and Sport Science*, *5*(2), 277–285. https://doi.org/10.52188/ijpess.v5i2.1243

Isnaini, L. M. Y., Kurniawan, A. W., Vigriawan, G. E., Akhiruyanto, A., & Nor, M. A. M. (2026). "Pass To The Wall" Educational Game: A Creative Solution for Basketball Chest Pass Learning. *Indonesian Journal of Physical Education and Sport Science*, *6*(1), 50–59. https://doi.org/10.52188/ijpess.v6i1.1938

Juditya, S., Zakaria, D. A., Hardi, V. J., Sutiswo, S., & Sunarsi, D. (2021). Digital Material Teaching: Learning Model and Learning Outcomes of Basketball. In *Journal of Educational Science and Technology (EST)*. https://doi.org/10.26858/est.v0i0.18375

Koh, K. T., Li, C., & Mukherjee, S. (2021). Preservice physical education teachers' perceptions of a flipped basketball course: Benefits, challenges, and recommendations. *Journal of Teaching in Physical Education*, *40*(4), 589–597. https://doi.org/10.1123/JTPE.2019-0195

Kurniawan, A. W., Wiguno, L. T. H., Mu'arifin, M., Setyawan, H., Shidiq, A. A. P., García-Jiménez, J. V., Eken, Özgür, Latino, F., Tafuri, F., Pranoto, N. W., Rahmatullah, M. I., & Anam, K. (2024). Article RETRACTED due to manipulation by the authors I-Spring Assisted Development of a Basketball Shooting Technique Program: Article RETRACTED due to manipulation by the authors. *Retos*, *55*, 874-881. https://doi.org/10.47197/retos.v55.105437

Li, H., & Zhang, M. (2021). Artificial Intelligence and Neural Network-Based Shooting Accuracy Prediction Analysis in Basketball. *Mobile Information Systems*, *2021*. https://doi.org/10.1155/2021/4485589

Meirizal, Y., Hambali, S., Zakaria, D. A., Hidayat, Y., Bernhardin, D., & Pasundan, I. (2023). The Implementation of Flip Book-Based Audio-Visual Media in the Learning Basketball Lay-Up Shoot. *Musamus Journal of Physical Education and Sport (MJPES) MJPES Musamus Journal of Physical Education and Sport*, *6*(1), 140–147. https://doi.org/10.35724/mjpes.v6i1.5534

Mguidich, H., Chikha, H. B., Zoudji, B., & Khacharem, A. (2025). Combining Mental Imagery and Tracing Gestures to Enhance Basketball Tactical Learning. *Journal of Sport and Exercise Psychology*, *47*(5), 297-307. https://doi.org/10.1123/jsep.2024-0218

Naheria, N., Amiruddin, B., & Buhari, Muh. R. (2021). Improving of Basketball Game Learning Outcomes With Students' Learning Group Investigation. In *Acitya: Journal of Teaching and Education* (Vol. 3, Issue 1, pp. 17–26). download.garuda.kemdikbud.go.id. https://doi.org/10.30650/ajte.v3i1.1406

Nopembri, S., Rismayanthi, C., Putro, K. H., Kristiyanto, A., Margono, A., Karakauki, M., & Wahyudin, P. K. (2022). Improvement of Hots Method in Basketball Game Through Tgfu Learning. *Physical Education Theory and Methodology*, *22*(1), 85–91. https://doi.org/10.17309/TMFV.2022.1.12

Ntoumanis, N., & Standage, M. (2009). Motivation in physical education classes: A self-determination theory perspective. *Theory and Research in Education*, *7*(2), 194–202. https://doi.org/10.1177/1477878509104324

Nur, L., & Malik, A. A. (2021). Basketball Skill Achievements: Comparison between Technical Approach and Tactical Approach based on Physical Fitness Level. In *Jurnal Pendidikan Jasmani dan Olahraga* (Vol. 6, Issue 1, pp. 51–58). download.garuda.kemdikbud.go.id. https://doi.org/10.17509/jpjo.v6i1.31610

Olteanu, M., Oancea, B. M., & Badau, D. (2023). Improving Effectiveness of Basketball Free Throws through the Implementation of Technologies in the Technical Training Process. In *Applied Sciences (Switzerland)* (Vol. 13, Issue 4). mdpi.com. https://doi.org/10.3390/app13042650

Özbalta, E., Yavuz, M., & Kaya, T. (2022). National Basketball Association Player Salary Prediction Using Supervised Machine Learning Methods. *Lecture Notes in Networks and Systems*, *308*, 189–196. https://doi.org/10.1007/978-3-030-85577-2_22

Putra, M. I. N., Wahyudin, Fahrizal, Hudain, Muh. A., & Hasyim. (2024). Learning Basketball Dribbling Techniques in High School: Integrated Problem Based Learning Model with Audiovisual Media. *ETDC: Indonesian Journal of Research and Educational Review*, *4*(1), 68–78. https://doi.org/10.51574/ijrer.v4i1.2697

Reis, C. P., Morales, J. C. P., Gomes, C. M. A., Pereira, F. de A. A., & Ibáñez, S. J. (2021). Construct Validation of a New Instrument to Measure Declarative Tactical Knowledge in Basketball. *Perceptual and Motor Skills*, *128*(4), 1712–1729. https://doi.org/10.1177/00315125211016247

Sarlis, V., & Tjortjis, C. (2020). Sports analytics Evaluation of basketball players and team performance. *Information Systems*, *93*. https://doi.org/10.1016/j.is.2020.101562

Shi, Shi, D. (2024). The Role Of Basketball In Enhancing Students' Teamwork Skills

Su, F., & Chen, M. (2022). Basketball players' score prediction using artificial intelligence technology via the Internet of Things. *Journal of Supercomputing*, *78*(17), 19138–19166. https://doi.org/10.1007/s11227-022-04573-6

Sugiyono. (2017). Penelitian Kuantitatif. *Pemaparan Metodenpenelitian Kuantitatif*, *2*, 16.

Susanto, N., Dinata, W. W., Ihsan, N., Bahtra, R., Andria, Y., Pranoto, N. W., Anam, K., Sofyan, D., Lourenço, C. C. V., Burhaein, E., García-Jiménez, J. V., & Setyawan, H. (2023). Instrument for Assessing Basketball Skills in Junior High School Students in Indonesia. In *Journal of Physical Education and Sport* (Vol. 23, Issue 12, pp. 3220–3227). mail.efsupit.ro. https://doi.org/10.7752/jpes.2023.12368

Taborri, J., Molinaro, L., Santospagnuolo, A., Vetrano, M., Vulpiani, M. C., & Rossi, S. (2021). A machine-learning approach to measure the anterior cruciate ligament injury risk in female basketball players. In *Sensors* (Vol. 21, Issue 9). mdpi.com. https://doi.org/10.3390/s21093141

Tsai, W. L., Su, L. W., Ko, T. Y., Pan, T. Y., & Hu, M. C. (2021). Feasibility Study on Using AI and VR for Decision-Making Training of Basketball Players. *IEEE Transactions on Learning Technologies*, *14*(6), 754–762. https://doi.org/10.1109/TLT.2022.3145093

Waffak, M. N., Sukoco, P., Sugiyanto, F. X., Arifianti, E., Setiawan, J., & Daryono, R. W. (2022). Developing a Basketball Learning Model Using the Teaching Game for Understanding (Tgfu) Approach To Improve the Effectiveness of Hots in Elementary Schools. *Physical Education Theory and Methodology*, *22*(3), S21–S29. https://doi.org/10.17309/tmfv.2022.3s.03

Wu, Y., Deng, D., Xie, X., He, M., Xu, J., Zhang, H., Zhang, H., & Wu, Y. (2023). OBTracker: Visual Analytics of Off-ball Movements in Basketball. *IEEE Transactions on Visualization and Computer Graphics*, *29*(1), 929–939. https://doi.org/10.1109/TVCG.2022.3209373

Yahya, D. G., & Katea, A. J. (2026). The effect of educational exercises using a self-regulated learning strategy on learning the performance phases of the triple jump activity for female students. *Indonesian Journal of Physical Education and Sport Science*, *6*(1), 60–67. https://doi.org/10.52188/ijpess.v6i1.1941

Yang, C., Chen, R., Chen, X., & Lu, K. H. (2021). The Efficiency of Cooperative Learning in Physical Education on the Learning of Action Skills and Learning Motivation. In *Frontiers in Psychology* (Vol. 12). frontiersin.org. https://doi.org/10.3389/fpsyg.2021.717528

Yang, F., Ren, L., & Gu, C. (2022). A study of college students' intention to use metaverse technology for basketball learning based on UTAUT2. In *Heliyon* (Vol. 8, Issue 9). cell.com. https://doi.org/10.3389/fpsyg.2021.717528

Yao, P. (2021). Real-Time Analysis of Basketball Sports Data Based on Deep Learning. In *Complexity* (Vol. 2021). Wiley Online Library. https://doi.org/10.1155/2021/9142697

Zuo, K., & Su, X. (2022). Three-Dimensional Action Recognition for Basketball Teaching Coupled with Deep Neural Network. In *Electronics (Switzerland)* (Vol. 11, Issue 22). mdpi.com. https://doi.org/10.3390/electronics11223797

Information about the authors:

Dhika Bayu Mahardhika, : dhika.bayumahardhika@fkip.unsika.ac.id, https://orcid.org/0000-0002-6206-8719, Physical Education, Health and Recreation Study Program, Faculty of Teacher Training and Education, Singaperbangsa University, Karawang, West Java Province, Indonesia

Tedi Purbangkara, : tedi.purbangkara@fkip.unsika.ac.id, https://orcid.org/0000-0003-1670-9834 **,** Physical Education, Health and Recreation Study Program, Faculty of Teacher Training and Education, Singaperbangsa University, Karawang, West Java Province, Indonesia
Dikdik Fauzi Dermawan, : dfauzi.dermawan@fkip.unsika.ac.id, https://orcid.org/0000-0003-0536-1430, Physical Education, Health and Recreation Study Program, Faculty of Teacher Training and Education, Singaperbangsa University, Karawang, West Java Province, Indonesia
Alam Hadi Kosasih, : alamhadikosasih@uniga.ac.id, https://orcid.org/0000-0002-6170-8462, Sports Education Study Program, Faculty of Islamic Education and Teacher Training, Garut University, West Java Province, Indonesia
Bela Santika, : santikabela@upi.edu, https://orcid.org/0009-0007-2016-8301 , Physical Education, Health and Recreation Study Program, STKIP Purwakarta, West Java Province, Indonesia

Cite this article as:
Mahardika, D. B. Et all. (2026). Students' Perceptions of Understanding Basketball Skills and Concepts in Physical Education: A Case Study at Al Azhar 02 Tekraf Vocational School. *Indonesian Journal of Physical Education and Sport Science (IJPESS)*, *6*(1), page. doi

Students' Perceptions of Understanding Basketball Skills and Concepts in Physical Education: A Case Study at Al Azhar 02 Tekraf Vocational School

ORIGINALITY REPORT

5%
SIMILARITY INDEX

PRIMARY SOURCES

1	journal.unucirebon.ac.id Internet	129 words — 3%
2	jurnal.ut.ac.id Internet	33 words — 1%
3	ir-library.ku.ac.ke Internet	32 words — 1%
4	Charlie Dayon, Michael M. Sabugaa, Alfredo A. Delicano. "Digital Literacy and Language Learning Attitudes: How Online Learning Readiness Predicts Student Engagement in English Education", Springer Science and Business Media LLC, 2025 Crossref Posted Content	26 words — 1%

EXCLUDE QUOTES	ON	EXCLUDE SOURCES	< 1%
EXCLUDE BIBLIOGRAPHY	ON	EXCLUDE MATCHES	OFF