



Evaluating the Learning Outcomes of Volleyball Overhead Passing in Secondary School Physical Education

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ABSTRACT

Physical education is expected to develop students' motor competence, social-emotional capacity, and lifelong engagement in physical activity, yet international and Indonesian evidence shows that many school programs still struggle to translate curricular intentions into high-quality skill learning. In volleyball instruction, the overhead pass is especially important because it links ball control, tactical continuity, and cooperative play, but it is also highly sensitive to the quality of feedback, movement coordination, and learner motivation. This study aimed to evaluate the learning outcomes of overhead passing among Grade XI students at SMA Negeri 2 Tenggara Seberang during the 2024/2025 academic year and to identify the pedagogical and contextual factors that shape performance. The study employed a descriptive qualitative design with performance-based assessment, classroom observation, and documentation review. Thirty-four students participated through purposive sampling. Overhead-pass performance was assessed through three successive trials and interpreted using an interactive qualitative analysis model supported by categorical score displays. The findings show that most students were in the good category (65%), while 26% were in the less good category, 6% in the not good category, and only 3% in the very good category. These results indicate that the class had generally acquired the basic mechanics of overhead passing, but advanced consistency, precision, and tactical readiness remained limited. Observational evidence strongly associates performance quality with differences in attentiveness to feedback, movement confidence, and instructional responsiveness. The study concludes that adaptive, feedback-rich, and student-centered instruction strengthens mastery of overhead passing. The article contributes empirical and conceptual insight for teachers, curriculum developers, and researchers seeking to improve evidence-based volleyball instruction in secondary education.

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I. INTRODUCTION

Physical education plays a strategic role in supporting adolescents' motor development, active participation, and broader learning experiences in school. Research has shown that well-designed physical education contributes to motor competence, learning engagement, and positive attitudes toward movement-based activities (World Health Organization, 2024; UNESCO, 2024; Bourke et al., 2025; Khodaverdi et al., 2022). In school settings, volleyball is one of the most frequently taught team sports because it combines technical skill, coordination, communication, and cooperation in a pedagogically meaningful way. Among its basic techniques, overhead passing is essential because it supports ball control, continuity of play, and the organization of attacking patterns. For this reason, students' overhead-passing performance can be used as an important indicator of how effectively volleyball learning outcomes are being achieved in physical education

Among the basic volleyball techniques introduced in school settings, overhead passing is particularly important because it functions as a foundational skill for ball control, offensive organization, and continuity of play. To perform the movement effectively, students must coordinate body positioning, hand formation, timing, and force control. For this reason, overhead passing is not merely a mechanical action, but a coordination-intensive movement that reflects the quality of students' motor learning during instruction. In school practice, however, many students can imitate the movement form at a basic level while still struggling to perform it consistently, with directional accuracy, and with confidence.

Previous studies have shown that volleyball skill development is influenced by multiple factors. Feedback plays a central role in motor-skill acquisition, especially when it is timely, understandable, and matched to students' developmental needs (Zhou et al., 2021; Petancevski et al., 2022; Han et al., 2025; Mödinger et al., 2022). Volleyball-specific studies have also demonstrated that different forms of feedback can improve skill acquisition and that structured assessment can reliably capture technical performance (Ghorbanzadeh et al., 2017; Gabbett & Georgieff, 2006; Trajkovic et al., 2024). In addition, research in physical education suggests that student motivation, instructional design, and pedagogical climate influence how effectively students engage in learning tasks and respond to correction (Bracho-Amador et al., 2023; Fernandez-Espinola et al., 2022; Zhang et al., 2024). These studies indicate that successful skill learning in physical education depends not only on repetition, but also on the quality of feedback, motivational support, and the pedagogical structure surrounding practice.

In the Indonesian context, studies on volleyball passing ability have generally reported that students' performance tends to cluster in the middle category or is associated with physical

attributes such as arm and leg strength (Nurulita & Arfanda, 2024; Setyawan & Syafruddin, 2025). These studies are useful in showing the general level of students' achievement and the physical factors related to skill execution. However, many school-based studies still rely mainly on percentage reporting or intervention outcomes, with limited attention to how performance distributions reflect actual classroom learning conditions. For school improvement, descriptive evidence remains important because teachers need to know not only how many students perform well, but also what those results imply about the quality of learning that has taken place.

Based on this need, the present study examined the learning outcomes of volleyball overhead passing among Grade XI students at SMA Negeri 2 Tenggarong Seberang during the 2024/2025 academic year. The study used a descriptive design with a quantitative assessment to identify the distribution of students' overhead-passing performance under normal school learning conditions. To deepen the understanding of the quantitative results, the study also incorporated observational data related to students' technical behavior and responsiveness during testing. Accordingly, this study aimed to: (1) describe the distribution of students' overhead-passing performance, and (2) interpret the performance patterns in relation to observable technical and instructional conditions in the learning process. The study is expected to provide practical evidence for enhancing feedback, assessment, and task progression in school volleyball instruction.

II. METHODS

2.1. Research Design

This study employed a descriptive study design with quantitative assessment. The design was selected because the purpose of the research was to describe students' overhead-passing learning outcomes under ordinary school instructional conditions rather than to test the effect of a particular intervention. Descriptive research is appropriate when a study aims to present a systematic account of the characteristics or distribution of a phenomenon as it appears in a natural educational setting. In the present study, quantitative assessment was used to identify the distribution of students' overhead-passing performance, while observational evidence was used only to support the interpretation of the results.

2.2. Research setting and participants

The study was conducted at SMA Negeri 2 Tenggarong Seberang, East Kalimantan, Indonesia, during the 2024/2025 academic year. The participants were 34 Grade XI students who had

participated in volleyball training within the PJOK program. The participants were selected as an intact class that had completed the relevant learning unit, making them well-suited to describe the actual learning outcomes achieved in that school context. This classroom setting was considered relevant because Indonesian PJOK guidance emphasizes that secondary-level students are expected to demonstrate sport-related movement skills with proper procedures and meaningful participation (Kementerian Pendidikan Dasar dan Menengah, 2025).

2.3. Instruments and data collection

The main data were collected through an overhead-passing performance test. The test assessed students' ability to execute the overhead pass with appropriate body positioning, ball control, and directional accuracy toward the target area. The scoring principles were aligned with school-based volleyball skill assessment practices and were informed by previous studies on volleyball skill assessment and reliability (Gabbett & Georgieff, 2006; Trajkovic et al., 2024).

Each student completed three overhead-passing trials. The score obtained from each trial represented the student's performance on that attempt, and the average of the three trials was used as the student's final score. Based on the final score, students were then classified into four performance categories: very good, good, less good, and not good. These categories were used to present the distribution of learning outcomes at the class level.

To support the interpretation of the quantitative results, classroom observation was also conducted during the testing process. The observation focused on recurring technical errors, movement readiness, confidence during execution, attentiveness to teacher feedback, and general engagement in the task. In addition, documentation such as lesson records and assessment materials was used to support data organization and reporting.

2.4. Data analysis

The quantitative data were analyzed using descriptive statistics, expressed as frequencies and percentages, for each performance category. This analysis was used to show the distribution of students' overhead-passing outcomes across the class. Because the purpose of the study was descriptive rather than inferential, no hypothesis testing was performed.

The observational and documentation data were used as supporting information to interpret the quantitative findings. These data helped explain the technical and behavioral patterns observed during testing, particularly those related to movement control, body coordination, confidence, and responsiveness to feedback. Thus, the main analytical emphasis remained on the quantitative description of students' performance, while qualitative information functioned as contextual support.

2.5. Trustworthiness and ethical considerations

To strengthen the credibility of the assessment process, scoring was conducted using the same criteria for all students, and the observational notes were discussed with the physical education teacher to reduce the risk of one-sided interpretation. Participation in the study was voluntary, school permission was obtained prior to data collection, and student identities were kept confidential throughout the reporting process. Figure 1 illustrates the overall procedure of the study, including participant selection, overhead-passing assessment through three trials, supporting classroom observation, and the descriptive analysis used to interpret the results.

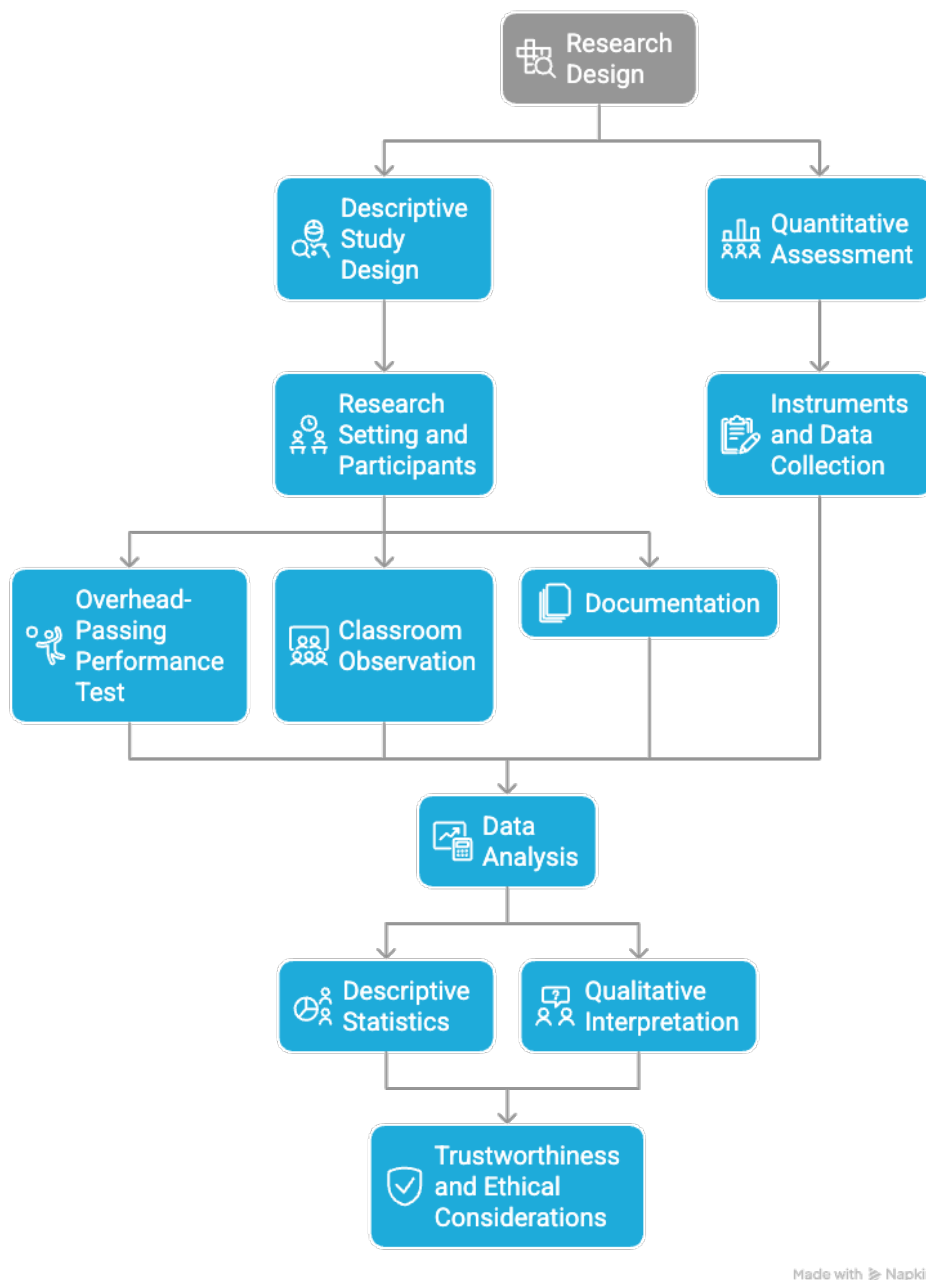


Figure 1. Research procedure for assessing students' overhead-passing learning outcomes

III.RESULTS

This study analyzed the overhead-passing learning outcomes of 34 Grade XI students. The quantitative results are presented as a frequency distribution of students' final performance categories, derived from the average of three overhead-passing trials. Table 1 presents the final distribution of overhead-passing performance after compiling the three trial averages for each student.

Table 1. Distribution of students' overhead passing performance

Category	Frequency (n)	Percentage (%)
Very good	1	3
Good	22	65
Less good	9	26
Not good	2	6
Total	34	100

Table 1 shows that the overhead-passing learning outcomes for the 34 students were unevenly distributed across the four performance categories. Most students, namely 22 students (65%), were classified in the good category, indicating that they had generally mastered the basic form of the movement with acceptable control. 9 students (26%) were categorized as less good, 2 students (6%) as not good, and only 1 student (3%) as very good. This distribution suggests that the class had developed a functional foundation in overhead passing, but advanced consistency and technical refinement had not yet been widely achieved. In other words, the learning outcomes reflected partial competence rather than fully mature performance.

Observation during the testing process helped clarify what distinguished these categories. Students in the very good and good groups typically entered the movement with a more stable, ready position, aligned their bodies under the ball more effectively, and produced cleaner finger contact at an appropriate point above the forehead. Their passes showed a more controllable arc and a clearer directional intention toward the target. By contrast, students in the less good and not good groups frequently contacted the ball too low, allowed the elbows to open excessively, or relied on arm force without sufficient contribution from lower-body balance and extension. These recurring errors reduced both control and accuracy, especially when the ball arrived slightly outside the ideal contact zone.

A second pattern concerned confidence and attentional focus. Students who performed in the upper categories generally appeared more willing to repeat the task, respond to correction, and make immediate technical adjustments after feedback. Their movement execution was not flawless, but it was more purposeful. Lower-performing students tended to hesitate before

contact, reset late, or rush the movement sequence, which often led to inconsistent ball trajectory. This suggests that the observed differences were not merely biomechanical; they were also behavioral. The quality of attentiveness, self-confidence, and responsiveness to instructional cues appeared closely connected to the final performance category.

From the standpoint of game application, the category profile has practical consequences. An overhead pass that is only moderately controlled may still appear acceptable in a static drill, but it becomes less dependable when students must react to variable tosses, communicate with teammates, or transition quickly from defense to attack. The present results, therefore, suggest that the class was better prepared for isolated skill execution than for fluid, game-like continuity. This distinction is pedagogically important because school volleyball instruction often overestimates mastery when assessment is limited to whether a student can complete the movement form, rather than whether that movement form remains functional under slightly more demanding conditions.

The results also indicate that the class had not yet reached an evenly distributed level of mastery. Eleven students, or nearly one-third of the sample, remained below the good category. This is a meaningful proportion in a school physical education context because volleyball tasks in actual gameplay require not only basic execution but also repeated, coordinated execution under dynamic conditions. A student who performs adequately in isolated practice but inconsistently under simple test conditions is likely to experience greater difficulty when tactical pressure and peer interaction are added. Thus, the present findings should be interpreted as evidence of partial competence: the foundation of overhead passing was present in the class, but the reliability of that competence across learners remained uneven.

It is also important to clarify the boundary of the available evidence. Since the archived dataset did not include subgroup breakdowns by sex, prior playing experience, or complete trial-level scores for every student, the present analysis does not infer differences across those dimensions. Instead, it concentrates on the relationship between the observed score distribution and the technical-behavioral patterns seen during instruction and testing. Within that evidentiary boundary, the main result is clear: most students had moved beyond a beginner level, but only a very limited number had transformed that basic competence into highly controlled and consistently reproducible overhead-passing performance. Figure 2 provides a visual summary of the distribution of students' overhead-passing performance across the four achievement categories.

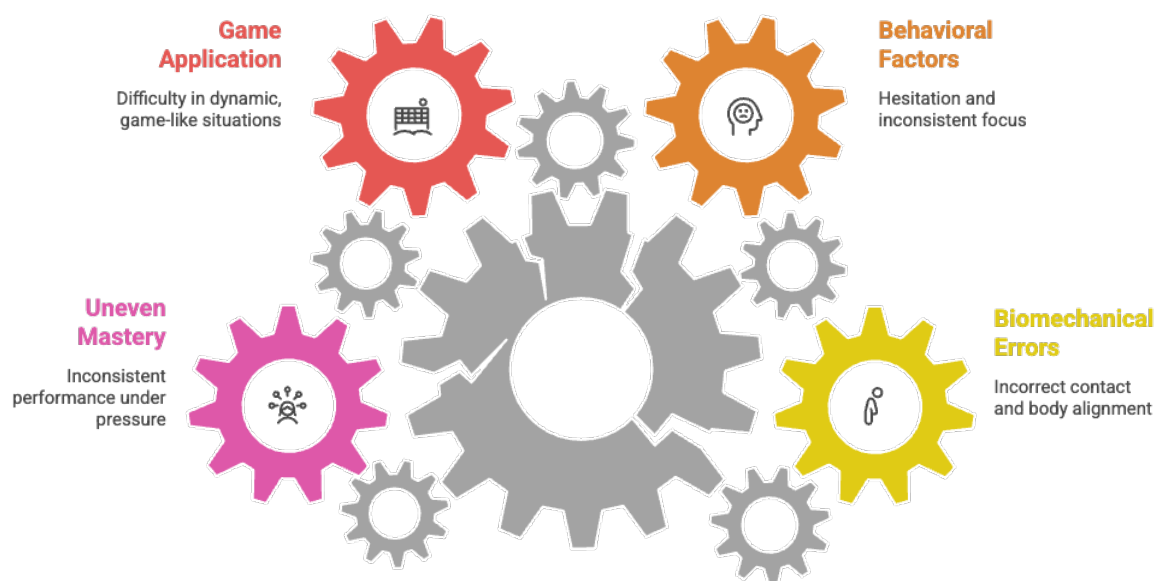


Figure 2. Distribution of students' overhead-passing performance across achievement categories

IV. DISCUSSION

The results indicate that volleyball overhead-passing learning in this class was generally functional but not yet fully mature. The dominance of the good category suggests that instruction succeeded in establishing a basic technical foundation, itself a meaningful achievement in secondary school physical education. This finding aligns with Loras (2020), whose meta-analysis showed that curriculum-based physical education can improve motor competence when skill content is taught deliberately rather than incidentally. At the same time, the extremely small proportion of students in the very good category reveals that the transition from acceptable execution to refined performance remained incomplete. In other words, the class appears to have reached threshold competence without yet achieving widespread technical fluency.

This pattern is pedagogically significant because overhead passing is a coordination-intensive skill. Effective performance requires students to judge incoming ball flight, position their bodies early, stabilize their lower limbs, prepare their hands correctly, and synchronize force production through their fingers, wrists, and upper body. When these elements are only partially integrated, the result is usually what was observed in the present study: technically recognizable performance accompanied by inconsistent height, direction, or control. The uneven category distribution, therefore, reflects more than differences in athletic talent; it reflects the difficulty of refining a complex motor sequence in a school setting where

instructional time, repetitions, and individualized correction are often limited. This interpretation is consistent with systematic evidence indicating that motor competence development in children and adolescents depends not only on exposure to practice but also on the quality and theoretical grounding of instructional interventions (Khodaverdi et al., 2022).

One of the clearest explanations for this unevenness concerns feedback. Systematic evidence shows that feedback is central to motor-skill learning in physical education, especially when learners are still building error-detection capacity (Zhou et al., 2021; Han et al., 2025; Mödinger et al., 2022). Petancevski et al. (2022) similarly concluded that augmented feedback usually improves performance and learning in gross motor and sport-specific tasks, although the strongest effects depend on feedback timing, frequency, and modality. Volleyball-specific evidence further supports this interpretation: Ghorbanzadeh et al. (2017) found that verbal, visual, and combined feedback all enhanced learning outcomes in volleyball. In the present study, higher-performing students appeared more capable of using teacher cues to recalibrate their movement, whereas lower-performing students often repeated the same errors across attempts. This suggests not only that feedback matters, but that students differ in how ready they are to convert feedback into action. For teachers, the implication is that demonstration alone is insufficient; feedback must be repeated, concrete, and adjusted to the learner's stage of control.

The findings also support the view that instructional design should move beyond drill-based repetition toward more student-centered learning environments. Research on physical education pedagogy increasingly shows that students learn more effectively when skill practice is embedded in meaningful roles, reflection, cooperation, and tactical understanding. Zhang et al. (2024) reported that the Sport Education Model improves students' attitudes toward physical education, while Tendinha et al. (2021) and Manninen and Campbell (2022) showed that this model can also strengthen motivation, basic psychological needs, and prosocial attitudes. Gustian et al. (2024) noted that Indonesian physical education still too often prioritizes narrow physical outcomes over holistic learning processes. The present results are consistent with that critique. The majority of students were able to reproduce the overhead pass at a basic level, yet the limited number of highly proficient performers suggests that practice may have emphasized compliance with movement form more than adaptive understanding of the movement. A more student-centered sequence, such as peer observation, target-based mini-challenges, or small-group correction tasks, would likely help students interpret the purpose of the movement rather than merely imitate its visible shape.

Motivation provides a second interpretive lens. In this study, students who performed

better were not only technically more stable; they were also more attentive, more willing to respond to correction, and less hesitant during execution. This behavioral pattern is consistent with self-determination theory and its application in physical education. Fernandez-Espinola et al. (2022) found that interventions grounded in self-determination and achievement-goal perspectives improve students' intention to remain physically active, while Barbosa Cano and Gomez-Baya (2025) concluded that autonomy-supportive, competence-enhancing, and socially supportive contexts produce more adaptive motivation in adolescents. At the classroom level, Bracho-Amador et al. (2023) showed that motivational climate influences satisfaction with physical education, and Antunes et al. (2024) reported that motivation is meaningfully related to physical activity behavior among school-aged students. This interpretation is also consistent with evidence that pedagogical models emphasizing meaningful participation and student roles can strengthen intrinsic motivation and support students' basic psychological needs in physical education (Manninen & Campbell, 2022; Tendinha et al., 2021). In sum, these studies suggest that the difference between a good pass and a hesitant pass is partly instructional and partly motivational. Learners are more likely to persist through the awkward stages of motor refinement when they experience the task as achievable, socially supported, and personally meaningful.

Another reason this matters is that motor competence in school years is linked to outcomes that extend beyond immediate sport performance. Wang and Wang (2024) found that motor skills are associated with academic achievement across school-aged populations, while Jackson et al. (2024) showed that programs that combine physical activity with social-emotional learning can strengthen broader adolescent development. This broader interpretation is also supported by Bourke et al. (2025), who showed that actual motor competence, perceived physical competence, and physical activity are meaningfully interconnected across children and adolescents. These studies do not imply that a single volleyball skill automatically transforms academic or psychosocial outcomes. They do suggest, however, that technically meaningful participation in physical education can contribute to students' wider sense of competence and belonging. In the present study, students who looked more assured during overhead passing also tended to engage more actively with the lesson context. That pattern strengthens the argument that skill learning in physical education should be interpreted through a holistic lens: when students experience success in technically demanding tasks, they are not only learning movement; they are also accumulating evidence that effort, adjustment, and cooperation can produce visible progress.

The current findings also need to be interpreted in relation to the Indonesian school

context. National guidance for PJOK emphasizes correct movement procedures, tactical understanding, and active lifelong participation (Kementerian Pendidikan Dasar dan Menengah, 2025). Yet international and national evidence indicates that many schools still struggle to provide sufficient time, infrastructure, and specialized pedagogical support to fully realize these goals. UNESCO (2024) has highlighted global shortages in quality physical education provision, and the WHO (2024) continues to stress the developmental importance of regular, meaningful physical activity for adolescents. In such contexts, school sport skills can easily be taught superficially: students appear to participate, but the learning conditions are not strong enough to generate high-level mastery across the whole class. The present class profile - broad basic competence with limited excellence - is consistent with this structural tension.

Assessment practice is another critical issue raised by the findings. In many school contexts, technical skills are evaluated summarily at the end of a unit, which can blur the distinction between participation, effort, and actual movement quality. The present study shows why that distinction matters. If most learners fall into the good category, while very few reach very good performance, then assessment should not simply certify completion; it should help diagnose which aspects of movement remain unstable. Prior work has shown that volleyball skill batteries can be both reliable and sensitive when criteria are explicit (Gabbett & Georgieff, 2006; Trajkovic et al., 2024). For school teachers, this means that assessment can be used formatively to identify whether the main problem lies in contact height, target direction, timing, or body alignment. Once the assessment performs this diagnostic function, it becomes a pedagogical tool rather than a terminal judgment. That shift is especially valuable in mixed-ability classes, where the same visible outcome may hide different underlying technical problems.

Comparison with previous Indonesian volleyball studies helps clarify the contribution of the present research. Nurulita and Arfanda (2024) demonstrated that overhead passing ability is significantly associated with arm and leg strength, underscoring that physical capacity supports technical execution. Setyawan and Syafruddin (2025) likewise found that school students' overhead-passing ability often remains in the middle range. The present study does not contradict those findings; rather, it extends them by showing how category distributions become more meaningful when interpreted alongside classroom behavior, response to feedback, and the pedagogical organization of practice. Instead of treating performance variation as a purely physical or statistical issue, this study reveals that instructional context mediates the translation of physical potential into observable school skill performance.

Methodologically, the study also demonstrates the value of combining skill assessment with qualitative interpretation. Volleyball skill testing has been shown to be reliable when carefully structured (Gabbett & Georgieff, 2006; Trajkovic et al., 2024), but numerical reliability alone does not explain why some students consolidate their technique faster than others in real classrooms. By placing the categorical results in dialogue with observational evidence, the study produces a more ecologically valid account of learning. This matters for school-based research because teachers do not teach percentages; they teach students whose technical errors, confidence levels, and responsiveness to instruction unfold in context. A descriptive qualitative design was therefore useful not despite the presence of performance data, but because it allowed those data to be interpreted pedagogically rather than mechanically.

Several practical implications follow. First, teachers should preserve repetition but enrich it with sharper formative feedback, especially on contact point, body positioning under the ball, and coordinated leg-arm extension. Second, practice tasks should be differentiated so that students who are still unstable can work with lower difficulty targets or controlled tosses before progressing to more dynamic exchanges. Third, peer-assisted learning can be incorporated so that students observe one another with explicit cues, which may increase both the volume of feedback and student engagement. Fourth, assessment should not wait until the end of a unit; brief formative checks during instruction may help identify students who are slipping into habitual technical errors before those errors become entrenched. These implications are consistent with broader evidence that physical activity and social-emotional learning can be productively integrated in adolescence when programs intentionally support cooperation, confidence, and purposeful participation (Jackson et al., 2024).

A further implication concerns teacher professional capacity. UNESCO's quality physical education agenda emphasizes that meaningful improvement depends not only on curriculum documents, but also on educators' ability to design inclusive, developmentally appropriate, and motivating learning experiences (UNESCO, 2024). The present study supports that position. The students did not appear to need more exposure to sport in the abstract; they needed instruction that translated curricular aims into sequenced tasks, provided specific correction, and provided psychologically supportive learning conditions. Professional development for PJOK teachers should therefore prioritize practical competencies such as giving concise technical cues, structuring progressions from controlled to game-like tasks, organizing peer feedback safely, and using assessment data to adapt instruction within the same unit. Without this pedagogical layer, curricular ambitions about motor competence and lifelong activity are unlikely to be realized consistently at the classroom level.

V. CONCLUSION

This study explored the learning outcomes of volleyball overhead passing among Grade XI students at SMA Negeri 2 Tenggara Seberang using a descriptive qualitative approach supported by performance assessments, observation, and documentation. The results show that most students reached a good level of performance, indicating basic technical skills, but only a very small portion achieved excellent mastery. The overall pattern suggests partial rather than complete skill acquisition: students generally understood the movement, but consistency, accuracy, and confident execution remained uneven across the class. Qualitative evidence also indicates that attentiveness to feedback, willingness to adjust movements, and overall engagement during practice were strongly associated with improved performance. These findings confirm that overhead passing achievement in school physical education is influenced by the interplay among technical practice, teaching quality, and student responsiveness.

The study has several limitations. It was conducted in a single school, used a relatively small purposive sample, and depended on categorical performance displays rather than a fully archived trial-level dataset. This restricts subgroup comparisons and more detailed statistical analysis. Future research should therefore combine classroom-based qualitative interpretation with richer performance analytics, longitudinal follow-up, and, where possible, video-supported movement analysis. Comparative studies across schools with different facility conditions and teaching models would also enhance external relevance. Despite these limitations, the study contributes to the physical education literature by providing a contextually grounded account of how volleyball skill learning develops in an Indonesian senior high school. Its main contribution is demonstrating that learning outcomes are more pedagogically useful when interpreted alongside behavioral, instructional, and contextual evidence. This approach can support more evidence-based planning for volleyball instruction and for quality physical education more broadly. For policy and practice, the study also shows that routine school-based research can produce usable evidence for local instructional improvement when teachers are willing to treat assessment results as material for reflection rather than mere reporting. This mindset is especially relevant for Indonesian secondary schools aiming to align everyday PJOK teaching with broader goals of quality physical education standards.

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