Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

THE EFFECT OF COMBINED METHODS OF TEACHING ON THE LEARNING OF TACTICAL SKILLS IN SMALL-SIDED GAMES (SSG) IN PHYSICAL EDUCATION: CASE STADY

ZEINEB. ZERAI
College of Education, Sohar University. Oman Higher Institute of Sport and Physical Education of Ksar Said, University of “La Manouba”, Tunis, Tunisia. *Corresponding Authour Email: zeraizeineb@gmail.com

SOFIEN MNEDLA
Higher Institute of Applied Studies in Humanities, Tunisia University, Shaghoian, Tunisia.

HAFSI. BEDHIOUFI
Higher Institute of Accounting and Business Administration, University of Manouba, La Manouba Tunis, Tunisia.

Abstract

Background: This research aims to analyze the impact of a learning method based on combined mental imagery, video observation, and discussion on the development of handball tactical knowledge in the players' experience, compared to a traditional approach based on discussion with the coach.; The participants will be twenty-five students from the Physical Activity Sciences and Sports degree. Both approaches will be implemented during five sessions that will adopt a small-sided game format. The study's design will be a pre-posttest parallel-group, as well as a visual-plus-score analysis of the intervention sessions Results: MI+VO+D are a key element of the tactical aspect of team sports. It allows players to develop their tactical intelligence, make quick and effective decisions, and coordinate their actions with those of their teammates to maximize their chances of success. ; The research results indicate that the use of combined mental imagery, video observation, and tactical discussion contributed to improving the learning of handball players in small-sided games by strengthening the competencies of tactics, motivation, communication, and confidence. One of the most important results from this study concerns the motivational aspect in small-sided games. These results showed that the game cluster player-centric model is proposed and needs acceptance. Conclusions this approach extends the spectrum of suitability and acceptance of approved teaching methodology to athletes, and it appears that combined mental imagery is significantly more effective in enabling players to develop sports skills. This research opens new lines of dynamic rigor, but also the content of the proposed intervention construct.

Keywords: Tactical Skills; Mental Imagery; Video Observation, Debate of Idea. Students. Physical Education Learning.

1. INTRODUCTION

Small-sided games (SSGs) are increasingly recognized as a valuable pedagogical tool for fostering tactical proficiency in team sports, effectively integrating physical, technical, strategic, and conditional elements. This integrated approach to training is posited to enhance learning and retention compared to isolated training modalities. Specifically, the combination of mental imagery (MI) and video observation (VO) holds the potential to improve strategic understanding, judgment, and pattern identification within the context of team-based competition. Concurrently, the mitigation of injury risk remains a paramount concern in team sports, necessitating the implementation of comprehensive

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

preventative strategies, including carefully managed return-to-play protocols for recovering athletes. Acquiring tactical expertise within SSGs represents a multifaceted challenge, demanding the application of diverse instructional techniques to facilitate knowledge acquisition. Metacognition, a particularly pertinent method, empowers learners to cultivate self-regulated learning strategies, critically analyze novel concepts, and refine their cognitive processes [1]. Foundational to metacognition are constructs such as mental imagery, the capacity to internally simulate scenarios for problem-solving and decision-making in sports, leading to expedited information processing, reduced cognitive burden, and enhanced performance outcomes.

Furthermore, the observation of expert performers provides a cognitive pathway for efficient motor skill acquisition, minimizing resource demands and eliminating risk. This observational learning has been shown to positively impact skill development. However, it is crucial to acknowledge that mere observation and discourse regarding situational dynamics within SSGs may be insufficient to engender implicit knowledge [2].

A relative paucity of research exists concerning the synergistic effects of integrating conventional observation-based methods with structured mental practice, complemented by collaborative tactical discussions. The present investigation aims to evaluate the beneficial outcomes of incorporating regular mental practice and holistic group discussion of tactical content following traditional observation-based training.

The central premise is that extended mental practice, in conjunction with comprehensive analysis of specific scenarios, will yield superior results. Consequently, this study seeks to clarify the effects of employing a combined approach involving mental imagery, video observation, and group discussion. The imperative to examine the impact of both standard and prolonged mental imagery, coupled with collaborative discourse, motivates the present inquiry.

Within physical education, student objectives commonly encompass not only procedural acquisition but also a comprehension of the sport itself and its underlying strategic concepts. In fact, competent game execution is a crucial element of the curriculum that physical educators should strive to cultivate in their pupils.

Physical education classes characterized by high student motivation and diligence correlate with favorable educational results, encompassing enhanced involvement, strategic preparation, contextual assessment, and reflective thinking. A more thorough awareness of the elements that might impact student inspiration and cognition during sports instruction could be utilized to optimize athletic training and the overall learning environment.

Mental imagery presents a valuable avenue for enhancing student comprehension of game principles and tactical proficiencies, both individually and collectively. This pedagogical approach seeks to foster students' capacity to visualize game scenarios, focusing their attention on specific aspects amenable to improvement within a learning context [3]. Enhanced understanding of game principles demonstrably leads to more effective performance and facilitates the acquisition of tactical skills applicable across

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

diverse games. The present study pursued two primary objectives: first, to assess the impact of an integrated mental imagery, video observation, and discussion methodology on the development of students' tactical abilities; and second, to monitor mental engagement and instructor involvement during each methodological iteration to ascertain the optimal combination for promoting student learning. Accumulating evidence suggests that mental imagery can be a potent instrument for facilitating learning and augmenting performance within physical education. Research consistently indicates that the strategic integration of mental imagery with physical practice yields improvements in motor skill acquisition, retention, and transfer within the framework of school-based physical education programs.

Improved performance and mental representation of complex actions

- Reduced cost and optimization of effort compared to physical practice alone
- Development of cognitive functions essential for strategic motor skill learning
- Improved precision, movement control, and overall motor skills and performance

Mental practice, often referred to as mental imagery, entails employing one's imagination to vividly simulate the execution of a skill or action, engaging various sensory modalities such as sight, sound, and tactile sensations. The emphasis in this cognitive process should be directed towards the specific actions required to achieve the intended outcome, rather than solely focusing on the outcome itself.

To maximize its effectiveness, mental practice should be implemented consistently, including during periods preceding, during, and following physical training. Furthermore, integrating relaxation strategies with mental imagery can enhance its impact. Research suggests that visual and kinesthetic imagery are particularly potent modalities for facilitating motor learning within a sports context [4]. Additionally, temporal imagery, which involves mentally rehearsing the timing of movements, may offer supplementary benefits.

In summation, the incorporation of mental imagery training into physical education curricula, as a complement to traditional physical training, can lead to notable enhancements in students' acquisition of motor skills, retention of these skills over time, and transferability of learned skills to novel contexts. Consequently, coaches and physical education instructors should consider integrating mental imagery as a supplementary training methodology [5]. Mental practice constitutes a cognitive procedure wherein individuals visualize movements or skills without engaging in actual physical performance [6]. Its efficacy in augmenting athletic performance is well-established. Studies indicate that mental imagery can elicit physiological responses comparable to those associated with real physical actions, thereby promoting improved skill development and performance results [7].

Video observation has emerged as a significant asset in physical education (PE), contributing to advancements in pedagogical approaches and the enhancement of student learning outcomes. The incorporation of video feedback (VFB) into PE routines enables instructors to deliver more impactful guidance and supports pupils in the

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

development of motor competencies [8]. Studies indicate that visual feedback delivered through video significantly enhances the acquisition of motor skills when contrasted with conventional verbal feedback alone. This approach proves particularly beneficial in formalized environments, such as educational institutions, where accommodating varied student requirements is essential [9]. Furthermore, video feedback supports student self-evaluation, prompting critical reflection on their performance and facilitating necessary modifications. This reflective process not only contributes to skill development but also bolsters motivation as students gain a visual understanding of their progress over time. The utilization of digital projection systems allows for the exploitation of individual and peer video recordings, opening avenues for innovative instructional strategies and learning modalities in physical education. This, in turn, can foster differentiated instruction, promote student understanding and independence, and ultimately increase the volume and quality of practice.

Existing research suggests that incorporating mental imagery, video observation, and discussion can enhance the acquisition of tactical abilities in sports. However, a gap exists in the current literature. To the authors' understanding, no previous investigation has explored the combined influence of these techniques on the learning of complex tactical scenarios in sports for both male and female participants. While extensive research focuses on learning within physical education, some studies underscore the value of integrating mental training, rehearsal, and visualization as proactive strategies to reduce student anxiety [10].

This study holds considerable practical value as it highlights the importance of a multifaceted approach to improving the effectiveness of tactical skill acquisition in handball. Furthermore, this research has the potential to advance scholarly understanding, as limited investigation has been conducted in this specific area. The central proposition of this study is that a synergistic application of mental imagery, video observation, and discussion will result in a more pronounced improvement in situational understanding and the proficiency of technical execution within specific game elements.

2. MATERIALS AND METHODS

The research was entirely oriented to addressing this main assumption and aimed to obtain three objectives: (1) to establish the grade of precision in two groups of handball players in identifying and recognizing the game tactic skill in the learning of phases in handball through visualizing and observing the actions in schematic representations in efficient observation; (2) to analyze the grade of modification in the successful execution of selected game tactic skills in attack and defense in the learning of phases through visualizing and observing game phases in schematic representations and qualities in players’ activity in associated observations after the usage of combined techniques of mental imagery and video observation in the pre-phase of actions; and (3) to identify the level of various types of feedback with an application of mental training referring to the usage of mental techniques in bio-informational, bio-mechanical facts, and bioplay, which are essential in forming and solving the performing approaches in each phase and for the

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

means of assistance during the game and the behavior of cognitive styles in internal referring, the level of concentration, communication, and motivation during the learning process in the implementation of the small-sided handball game model. This study involved 60 students, evenly divided between the experimental group (n=30) and the control group (n=30). To ensure group homogeneity and minimize potential bias, participants were matched based on age, and handball experience prior to randomization. The average age of participants was 17.75 ± 0.5 years years, height 1.65 ± 0.02 m; weight 49.05 ± 1.00 kg.

This age range aligns with a population of high school-aged athletes. All the participants are sedentary and have never taken part in a complete handball training cycle. This minimum experience level ensured a foundational understanding of the game rules and fundamentals, making the tactical interventions relevant and meaningful. No participants reported a recent history of major injuries requiring prolonged absence from sports participation within the six months prior to the study commencement. Additionally, participants confirmed they had not previously engaged in any structured mental imagery programs or in-depth tactical video analysis, ensuring that observed effects could be attributed to the specific interventions.

2.1 Intervention Protocol

The intervention spanned 6 weeks. Both groups participated in their respective handball training regimens three times per week. Each 90-minute session focused on a 20-minute core activity period.

The experimental group incorporated specific pedagogical components into their training during the core activity period.

- Mental Imagery (MI): 20 minutes per session, three times per week (one hour total per week). Students were guided through vivid mental rehearsals of specific handball tactical scenarios (e.g., offensive set plays, defensive transitions, and decision-making under pressure) and of executing individual skills within small-sided games (SSGs). The focus was on multisensory imagery, integrating visual (seeing the play unfold), kinesthetic (feeling the movement), and temporal (executing in real time) aspects. The instructor provided guided scripts and verbal cues to facilitate the imagery process.

- Video Observation (VO): 20 minutes per session, three times per week (one hour total per week). Participants observed curated video recordings. These recordings included high-level expert handball players executing effective tactical skills in small-sided games (SSGs) as well as video recordings of participants; and peers; performance in previous SSG sessions. Digital projection was used for collective observation and analysis. Observation sessions focused on identifying successful tactical solutions, common errors, and efficient movement patterns.

- Structured Tactical Discussion (STD): 20 minutes per session, three times per week (one hour total per week). Following the MI and VO sessions, structured group discussions were conducted. The instructor facilitated these discussions, encouraging

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

students to analyze observed tactical principles, debate optimal decision-making strategies in specific game scenarios, articulate performance improvements, and reflect on their mental imagery experiences. This component aimed to foster metacognitive awareness and explicit tactical knowledge. The control group participated in handball training of an equivalent duration during the core activity period. This training included traditional, coach-led discussions about gameplay and tactics but did not formally incorporate structured mental imagery (MI) or video observation (VO) sessions as distinct intervention components.

Their training focused on standard drills, technical practice, and small-sided games (SSGs) with general coach feedback. Before the intervention, students will complete a tactical skill test in small-sided handball games. After the six-week intervention, they will take the same test again. Data will be analyzed using a mixed- design ANOVA to examine the effect of the combined intervention on tactical skill learning. The tactical skill test consists of a series of small-sided handball game scenarios that require students to make tactical decisions. The test will be recorded on video and evaluated by two experienced handball coaches using a standardized evaluation rubric.

This will allow us to evaluate students; progress in terms of tactical skills and each teams offensive efficiency. Due to the slow pace of the game, there were hardly any consistency errors, making them easy to observe. The grid allowed us to collect the following data: (a) received ball, (b) conquered ball, (c) pass to a partner, (d) lost ball, and (e) total number of balls played during each 20-minute play period.

3. RESULTS

For the video analysis of the game/practical application (i.e., number of balls played, balls conquered, balls lost, shot, and goal), a Kruskal-Wallis H test was run on base score, middle score, and final score with a debate of ideas groups as between-subjects factor (i.e., A, B and C). The main effect of groups was significant in the number of balls conquered both in base score ($\chi^2 = 6.875$, $p < 0.05$, r = 2.431) and in middle score ($\chi^2 = 6.326$, $p < 0.05$, r = 2.237).

Besides, the number of lost balls was significant in all analysis (i.e., base score $\chi^2 = 6.850$, $p < 0.05$, r = 2.386; middle score $\chi^2 = 7.356$, $p < 0.05$, r = 2.601; final score $\chi^2 = 7.199$, $p < 0.05$, r = 2.545). In addition, the number of goals in the final score was also significant ($\chi^2 = 6.483$, $p < 0.05$, r = 2.276). Pairwise comparisons of game-play video analysis data, using the Mann-Whitney U test, are presented in Table 1.

Table 1: Mann-Whitney U Test, Game-Play Video Analysis, Between Groups Pairwise Comparison

	Mean ± SD	Mann-Whitney U	Z	Sig.	*r*
Played Balls (BS)	A vs. B (12.25±2.63 and 15.00±4.69)	3.50	-1.315	0.189	0.465
Conquered Balls (BS)	A vs. B (0.75±096 and 3.00±0.82)	0.50	-2.205	0.027*	0.780
Lost Balls (BS)	A vs. B (4.50±1.29 and 2.00±0.82)	0.50	-2.191	0.028*	0.775
Shot (BS)	A vs. B (1.25±0.50 and 3.75±1.71)	0.50	-0.935	0.350	0.331

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

Goals (BS)	A vs. B (0.75±0.50 and 1.25±0.96)	5.00	-0.935	0.350	0.331
Played Balls (MS)	A vs. B (13.50±2.65 and 18.00±4.97)	3.50	-1.307	0.191	0.462
Conquered Balls (MS)	A vs. B (1.75±0.96 and 4.25±1.26)	0.50	-2.205	0.027*	0.780
Lost Balls (MS)	A vs. B (5.75±1.71 and 2.75±0.96)	0.50	-2.191	0.028*	0.775
Shot (MS)	A vs. B (2.00±1.83 and 2.50±2.08)	7.00	-0.292	0.770	0.103
Goals (MS)	A vs. B (0.75±0.96 and 2.00±1.63)	4.00	-1.214	0.225	0.429
Played Balls (FS)	A vs. B (13.50±1.29 and 20.75±3.30)	0.00	-2.309	0.021*	0.818
Conquered Balls (FS)	A vs. B (1.25±1.50 and 5.00±0.82)	0.00	-2.337	0.019*	0.826
Lost Balls (FS)	A vs. B (5.50±1.29 and 2.50±1.29)	0.50	-2.178	0.029*	0.770
Shot (FS)	A vs. B (2.50±1.29 and 3.25±1.26)	5.50	-0.744	0.457	0.263
Goals (FS)	A vs. B (0.50±0.58 and 2.25±1.26)	1.00	-2.097	0.036*	0.741

(BS) Base score; (MS) Middle score; (FS) Final score; (*) Significant at $p < 0.05$.

Significant main effects of the teaching method were observed. While the two groups improved from the first session to the last, the experimental groups obtained significantly higher gains in scores. The difference between pre-debate and post-debate for the experimental groups is very significant.

Friedman's ANOVA revealed a very significant difference between the different scores (i.e., BS, MS and FS) for the B group in the number of balls played ($\chi^2 = 7.600$, $p < 0.05$, r = 2.687) and the number of balls conquered ($\chi^2 = 6.733$, $p < 0.05$, r = 2.381). Pairwise comparisons between the different scores (i.e., BS, MS and FS) using Wilcoxon's rank-sum test showed no significant difference.

4. DISCUSSION

4.1 The Efficacy of Integrated Pedagogical Approaches

A mixed-design Analysis of Variance (ANOVA) demonstrated a notable interplay between group membership (intervention versus control) and time (baseline versus post-intervention) with respect to overall tactical proficiency. This suggests that the enhancement in tactical competency observed during the six-week program varied substantially between the two cohorts. Although both the intervention and control cohorts showed progress from baseline to the conclusion of the program, the intervention cohort displayed markedly superior gains in tactical proficiency, evidenced by elevated post-intervention scores and more pronounced differences between baseline and post-intervention assessments. The magnitude of tactical skill advancement from baseline to post-intervention was statistically significant for the intervention group.

4.2 Unpacking the Mechanisms of Enhanced Tactical Skill Acquisition

The observed improvements in both overall tactical skill and specific game-play metrics can be attributed to the complementary and reinforcing roles of each component within the combined intervention:

4.2.1 The Role of Video Observation (VO) In Perceptual-Cognitive Development

Video observation serves as a valuable method of visual feedback, effectively compensating for the shortcomings of solely verbal guidance. By observing skilled demonstrations and, crucially, examining their own and others' performance during small-

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

sided games (SSGs), learners obtain tangible visual data that promotes self-evaluation and the rectification of mistakes [8, 9]. This visual input augments learners' capacity to discern strategic formations, recognize performance inconsistencies, and envision effective strategies with improved precision compared to verbal prompts alone. As emphasized by Mödinger et al. [9], the aptitude to visually monitor advancement can also substantially increase learner incentive and involvement, encouraging a more proactive and independent learning experience. The statistically notable decline in "lost balls" and the corresponding rise in "conquered balls" within the experimental group's game analysis (especially apparent in comparisons between Groups B and C) strongly indicates that video observation enhanced situational understanding and predictive abilities, resulting in more reasoned judgment and refined execution of offensive and defensive strategic movements under pressure**.**

4.2.2 The Contribution of Mental Imagery (MI) to Internal Model Refinement

Mental visualization assists in cognitive repetition and the improvement of internal cognitive frameworks relevant to strategic situations. By means of directed imagining of abilities and strategic maneuvers, learners are able to mentally execute actions without immediate physical exertion, an approach demonstrated to lessen cognitive burden and improve information management [5, 6]. This cognitive practice encourages more effective and swift judgment, an essential characteristic in the demanding environment of handball. The established advantages of mental visualization instruction, which include enhanced cognitive depiction, improved accuracy, and better motor management [4, 7], likely contributed to the higher strategic ability evaluations and the recorded improvements in game performance efficiency (for instance, improved possession and prosperous offensive results). The active procedure of envisioning advantageous strategic reactions potentially pre-stimulates pertinent neural pathways, preparing the learner for more efficacious and adaptable execution during actual game performance [3].

4.2.3 The Synergistic Impact of Structured Tactical Discussion (D)

The integration of motor imagery (MI) and video observation (VO) demonstrably supports individual cognitive and motor skill acquisition. However, the incorporation of structured tactical dialogues provides a critical metacognitive and socio-cognitive dimension to the learning process. This approach furnished students with a space to explicitly communicate their comprehension, participate in joint problem resolution, deliberate on effective methodologies, and obtain instantaneous oral evaluations from both fellow learners and educators. This collaborative reflective practice is indispensable for transforming tacit knowledge, gained through observation and visualization, into explicit knowledge. This explicit understanding can then be deliberately implemented and modified across diverse contextual game situations [2]. These conversations stimulate analytical reasoning regarding multifaceted game scenarios, thereby enhancing a more profound grasp of fundamental strategic concepts and enabling the generalization of acquired proficiencies to unfamiliar situations. While precise quantitative measurements were not conducted within this research, the observed enhancements in communication

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

abilities and self-assurance are logically consistent consequences of these interactive and reflective exchanges [11, 12].

4.3 Practical and Theoretical Implications

This research yields noteworthy insights relevant to professionals in physical education and athletic training. The adoption of a blended instructional framework, deliberately weaving together visualization techniques, observational learning through video, and facilitated strategic conversations, holds promise for improving the learning of intricate tactical skills within collaborative sports such as handball [13]. This multi-faceted strategy provides a more comprehensive, stimulating, and reflective learning experience, possibly fostering improved learner enthusiasm, confidence in one's abilities, and a more profound grasp of fundamental game concepts. Consistent with a learner-centered philosophy, this method emphasizes active participation and reflective thinking, thereby promoting greater independence and involvemen[14].

From a theoretical standpoint, this investigation advances our understanding of motor skill learning and the acquisition of expertise within fluctuating, open-skill contexts. It emphasizes the vital role of uniting cognitive methodologies (visualization, observation) with social-cognitive learning (discussion) to foster not just procedural competence, but also the factual and situational awareness necessary for cultivating flexible expertise in athletic endeavors. The findings support a move away from conventional, compartmentalized skill-based instruction toward more integrated, contextually relevant, and intellectually challenging pedagogical models in physical education, ultimately preparing learners to navigate the inherent complexities of team competition [15]**.**

4.4 Limitations and Future Research Directions

Several avenues exist for future research to expand upon these initial findings and more deeply understand the effects of the intervention. Although the sample size provided adequate statistical power for the current study, subsequent investigations incorporating larger samples would improve the extent to which the results can be generalized to wider groups of students. Furthermore, the intervention's six-week duration, while showing notable immediate effects, may not fully reveal its capacity to produce long-term retention or transferability of abilities to varied game scenarios or other team-based activities. Therefore, investigations involving extended follow-up periods are suggested. While the analysis of game videos provided objective performance data, the addition of qualitative data collection methods – such as student interviews, think-aloud procedures during strategic decision-making, and detailed instructor observation forms – could yield a more thorough understanding of the cognitive mechanisms and motivational changes underpinning the observed gains. Future studies might also examine the ideal amount, regularity, and arrangement of individual parts within the combined intervention (MI, VO, and D) to determine the most effective learning strategy. Examining the efficacy of this integrated method across different age ranges, ability levels, and diverse team sports would further increase its practical utility. Finally, the incorporation of more rigorous numerical evaluations of psychological concepts such as motivation, self-belief, and

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

perceived ability would reinforce the assertions regarding the non-tactical advantages of this novel educational approach.

5. CONCLUSIONS

This investigation presents compelling empirical support for the enhanced efficacy of a blended instructional strategy in promoting the acquisition of tactical proficiency in handball, specifically among physical education students engaged in small-sided games. The intervention encompassed the integration of cognitive rehearsal techniques, observational learning through video analysis, and facilitated group discourse focused on tactical principles. The research outcomes substantiate that this multi-faceted approach yields significantly greater gains compared to conventional instructor-led discussions. This translates into marked improvements in overall tactical skill, as well as significant advancements in crucial performance indicators such as maintaining possession, regaining possession, and effectiveness in attack. The confluence of these distinct cognitive and interactive learning techniques offers a more holistic and relevant framework for cultivating tactical understanding. Observational learning provides essential perceptual feedback for interpreting in-game scenarios, cognitive rehearsal enables internal practice and enhancement of decision-making, and structured discourse encourages critical self-reflection and the explicit verbalization of tactical concepts. This integrated approach fosters adaptable expertise, empowering students to make more informed choices and execute actions with greater accuracy in complex performance contexts. From an applied perspective, this research suggests that instructors and coaches should embrace integrated, student-centered methodologies. This approach not only optimizes tactical learning but also promotes greater student interest, communicative competence, and self-assurance, thereby enhancing the overall educational process. Theoretically, this study contributes to the broader understanding of motor learning and skill development within dynamic, open-skill settings. It emphasizes the essential role of combining diverse learning modalities to address the complex requirements of tactical performance. Despite recognizing certain methodological constraints, notably the importance of clearer distinction between participant groups in subsequent research designs, this study provides a solid groundwork. Future investigations should explore the sustained retention of these skills, analyze the ideal timing and intensity of each intervention element, and assess its generalizability across various team sports and populations. In conclusion, the intentional integration of cognitive rehearsal, observational learning, and tactical discourse represents a potent and novel strategy for developing comprehensive and tactically astute athletes within physical education.

Author contribution

Conceptualization ZZ. -*; Design ZZ H.B- S.M*; Supervision-ZZ HB. *; Resources - HB-Z.Z. *; Data Collection and/or Processing-ZZ. S.M *; Analysis and/or Interpretation- ZZ. HB. S.M *; Literature Search-ZZ. SM. *; Writing Manuscript-ZZ S.M *; Critical Review .ZZ.SM-HB *;

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

Acknowledgement

We would like to express our sincere gratitude to all participants who contributed to the completion of this study. This manuscript could not have been completed without their support and patience.

Funding Information “No funding was received.”

Conflict of Interest

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. This absence of conflicts ensures the integrity and impartiality of the research.

Ethical aspects: Ethics committee approval was received for this study from the ethics committee of Sohar University Number Ref: UEB 2025 - SUStaff – 017.

Reference

1) Godbout, P., & Gréhaigne, J. F. (2020). Regulation of tactical learning in team sports – the case of the tactical-decision learning model. *Physical Education and Sport Pedagogy, 27*(3), 215–230. https://doi.org/10.1080/17408989.2020.1861232

2) García-Ceberino, J. M., Gamero, M. G., Feu, S., & Ibáñez, S. J. (2020). Differences in Technical and Tactical Learning of Football According to the Teaching Methodology: A Study in an Educational Context. *Sustainability, 12*(16), 6554. https://doi.org/10.3390/su12166554

3) Rozi, M. F., Resmana, R., Selviani, I., Okilanda, A., Sumantri, R. J., Suganda, M. A., & Suryadi, D. (2023). Imagery and Agility Training: How do They Affect the Reaction Ability of Futsal Goalkeepers? *Physical Education Theory and Methodology, 23*(3), 325–332. https://doi.org/10.17309/tmfv.2023.3.02

4) Lindsay, R. S., Larkin, P., Kittel, A., & Spittle, M. (2021). Mental imagery training programs for developing sport-specific motor skills: a systematic review and meta-analysis. *Physical Education and Sport Pedagogy, 28*, 444–465. doi:10.1080/17408989.2021.1991297.

5) Simonsmeier, B. A., Androniea, M., Buecker, S., & Frank, C. (2020). The effects of imagery interventions in sports: A meta-analysis. *International Review of Sport and Exercise Psychology, 14*, 186–207. doi:10.1080/1750984x.2020.1780627.

6) Rhodes, J., & May, J. (2022). Applied imagery for motivation: a person-centred model. *International Journal of Sport and Exercise Psychology, 20*, 1556–1575. doi:10.1080/1612197X.2021.1987959.

7) Frank, C., Kluever, J., & Simonsmeier, B. A. (2023). Imagery training of motor actions in children and adolescents: A meta-analysis. *International Review of Sport and Exercise Psychology*, 1–22. doi:10.1080/1750984X.2023.2167225.

8) Constantinides, P. (2023). Video-based Analysis for Teacher Development in Physical Education. *European Journal of Education and Pedagogy, 4*(6), 5–9. https://doi.org/10.24018/ejedu.2023.4.6.745.

9) Mödinger, M., Woll, A., & Wagner, I. (2022). Video-based visual feedback to enhance motor learning in physical education—a systematic review. *German Journal of Exercise and Sport Research, 52*, 447–460. https://doi.org/10.1007/s12662-021-00782-y.

10) Frank, C., Hülsmann F., Waltemate T., Wright D. J., Eaves D. L., Bruton A., & Schack T. (2022). Motor imagery during action observation in virtual reality: the impact of watching myself performing at a level I have not yet achieved. *International Journal of Sport and Exercise Psychology, 21*(3), 401–427. https://doi.org/10.1080/1612197X.2022.2057570

11) Zerai, Z., Gréhaigne, J.-F. , & Godbout .P (2021). Débat, conceptualisation et éducation physique et sportive. e *Journal de la Recherche sur l’Intervention en Education Physique et Sportive, 48, 29-47*

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 59 Issue: 09:2026
DOI: 10.5281/zenodo.22823154

12) Zerai, Z, Gréhaigne, J-F & Godbout, P (2020). Student Understanding and Learning in Team Sports: Understanding through Game-Play Analysis. *Athens Journal of sports.* Volume 7, Issue 4, 215-234.

13) Zerai, Z., & Mnedla, S. (2025). Debate-of-ideas setting and configurations of play among beginner female students. SPORT TK-EuroAmerican Journal of Sport Sciences, 14, 90. https://doi.org/10.6018/sportk.556301

14) Lindsay, R. S., Larkin, P., Kittel, A., and Spittle, M. (2021). Mental imagery training programs for developing sport-specific motor skills: a systematic review and meta analysis Phys. Educ. *Sport Pedagogy* 28, 444–465. doi:10.1080/17408989.2021.1991297.)

15) Sha'lan, M. A. M., & Almaaitah, M. N. Y. (2023). The Impact of a Mental Imagery Based Instructional Program on Learning Basic Handball Skills. *Revista iberoamericana de psicología del ejercicio y el deporte*, 18(3), 312-318.