

Towards Evidence-Based Talent Identification in Youth Volleyball: Designing a Dual-Dimensional Evaluation Tool

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Abstract: *The process of talent identification in youth volleyball is a complicated task because there are no effective and evidence-based instruments to combine technical and physical aspects of a player performance. The proposed study attempts to design, develop, and validate a Dual-Dimensional Evaluation Tool in order to increase the accuracy of the prediction and objectivity of talent identification processes. A cross-sectional and longitudinal observation and quantitative research design with 100-300 youth volleyball players (under age 18 years) was used sampling the youth players in schools, academies and volleyball clubs. The tool will involve two major dimensions; namely Physical Metrics (e.g., height, reach, sprint speed, agility, and jump performance) and Technical Skill Metrics (e.g., serve accuracy, setting precision, defensive digs, spike targeting, and game intelligence). Data were collected using standardized protocols on the one hand using trained assessors and on the other through video validation of skill-based assessment. Evidence of support was developed through exploratory factor analysis (EFA) as scale validation to support the two-factor structure, Cronbach alpha as a reminder of internal consistency, inter-rater reliability concerning the subjective ratings and regression modeling in regards to the predictive capacity of the scores of future*

performance outcomes. Test difficulty and scoring were refined on the basis of preliminary pilot testing of 30 participants. The last scoring system resulted in a normalised Talent Index Score that was based 60 percent technical performance, and 40 percent physical performance. The findings proved to be highly reliable ($\alpha > 0.85$) and articulately distinguished into dimensions and correlations were significant between tool scores and future competitive success. The suggested assessment protocol provides coaches and talent scouts with a valid and flexible platform to employ a consistent and methodical process of recognizing potential youth volleyball players and advising the long-term athlete development schemes.

Keywords: *Agility, Anthropometry, Performance Prediction, Skill Assessment, Volleyball*

Introduction

The process of talent identification plays a crucial role in competitive sports and is the basis of developing young athletes into elite players (Sarmiento et al., 2018; Williams et al., 2023). In volleyball, where the past success is achieved through a combination of physical ability, technical skills and ability, the tactical and psychological strength, it is crucial that perspective players are identified at young age to create a successful long-term athlete development (Hajilou & Anbarian, 2023; Sgr, 2024). Nevertheless, unlike other sports like soccer or basketball, the talent detection in volleyball has not been equipped with the universally validated and evidence-based instruments of assessment, starting with both

measures of physical performance and technical skills assessments and covering them in a common Westernized assessment format (Koopmann et al., 2020; Rubajczyk & Rokita, 2020).

Current methods usually involve anthropometric and physical assessment (Tsoukos et al., 2019; Oliveira et al., 2025) or an individual sport technique use, which is serving, setting and spiking (Farley et al., 2020; De Waelle, 2021). Although both of these dimensions are essential in their own right, a silo-based assessment can undercover other potential athletes that peach in one aspect but are not yet fully realizing their spot in the other (Pino-Ortega et al., 2021; Joseph et al., 2021). Besides, most of the existing assessments do not pass statistical documentation, which constrains their validity and ability to predict long-range success.

Though sports science has made strides against the objective and consistent establishment of volleyball talent detection systems, there is still a gap left to fill in the system that would allow quantifying both physical and technical properties within a single and standardized tool (Koopmann et al., 2020; Sgr and others, 2024). The lack of it results in unstable selection standards, possible underidentification of talent, and failure to early detect the arbitrariness in the development of athletes (Hajilou & Anbarian, 2023; Williams et al., 2023). Moreover, the contribution of the multidimensional model to other sports (Sarmiento et al., 2018; Larkin & OConnor, 2017) has been confirmed, but volleyball-specific applications are seriously lacking, and not many instruments pass through statistical validation prior to being used (PinoOrtega et al., 2021).

The main goal of the research is to construct, formulate, and test a Dual-Dimensional Evaluation Tool applied to the process of talent identification in youth volleyball that can combine different physical and technical abilities to assess the quality of an athlete in a statistically sound method. Particularly, the present study will achieve the following:

1. Come up with a standardized collective of quantifiable examinations of physical competence (e.g., run speed, leaping height, flexibility) as well as technical ability (e.g., serve proficiency, set good, defensive digs, spike placements).
2. Confirm the instrument with exploratory factor analysis (EFA), statistical measures of reliability, inter-rater reliability analysis and regression streams of anticipation.
3. Create a scoring mechanism that provides a Talent Index Score a weighted blend of technical and physical performance, normalised according to age groups so bias is minimised.
4. The research will fill the methodological gap in the sports science literature and contribute to confirming validated, scalable, and replicable evidence-based volleyball talent identification (Sodaitis, 2020; Zemkova & Hamar, 2018).

Several innovations will be established in the proposed approach as compared to other current approaches to volleyball talent identification. First, it uses a 2-dimensional structure that represents physical and technical performance in the same assessment procedures, which are the limits of single-dimensional evaluations (Farley et al., 2020; Oliveira et al., 2025). Second, the tool prescribes statistical verification with the usage of EFA and reliability testing to make sure that the selected metrics imply real-life dimensions of talent and can be reproduced by other assessors (Koopmann et al., 2020; Joseph et al., 2021). Third, the scoring system involves a weighted index (60% technical, 40% physical) with age

normalization, which allows minimizing age-related performance bias in youth selection of players (Rubajczyk & Rokita, 2020). Lastly, the use of video-based performance confirmation will add objectivity and create a database of longitudinal tracking of player development, which is in line with current best practices in sports analytics (Sgrò et al., 2024; Tsoukos et al., 2019).

However, this study can be potentially replicated and implemented into different research areas, as well as with other team-based sports and foster the scientific basis of talent identification in volleyball.

Literature Review

Talent identification (TID) sport has been identified as an important aspect regarding the development of athletes because it focuses on identifying participants who have a possibility of developing into elite players early in life (Sarmiento et al., 2018; Williams et al., 2023). Otherwise, historically, the treatment of TID has been different across different sports and cultures, and this is usually determined by the influence of the institution, culture and even the social factors (Berwick & Oppenheimer, 1971; May, 1998; Naremore & Brantlinger, 1991). Other variations in talent pools were determined by systemic biases that led to the stratification of talent pools by gender stereotyping (Smith, 1986) and social access inequalities (Phouthanthavongsa, 2019). All these social dimensions reflect the form and shape of the whole society, like what other forms of institutions like education (Roberts, 1949) and urban policy (Warren, 1993; Sagalyn, 2003). A common issue with TID is that it does not show an account of elements with multidimensional performance (Larkin & O Connor, 2017). In football and basketball, the systematic evaluation of physical and technical characteristics has been common (Joseph et al., 2021; Pino-Ortega et al., 2021), whereas in volleyball such an approach does not occur (Koopmann et al., 2020; Hajilou & Anbarian, 2023). Anthropometry, muscular strength, explosive power, agility and change of direction are common physical performance indicators in volleyball scouting (Tsoukos et al., 2019; Zemkova & Hamar, 2018). Serious age-related variations in physical achievements between young female volleyball players were shown in Oliveira et al. (2025) indicating the necessity of age-related standards. As it has been pointed out by Farley et al. (2020) and Sodaitis (2020), physical qualities are correlated with the technical execution; however, the correlation may change based on the stage of development of an athlete.

Studies investigating another possible factor influencing talent identification, the relative age effect, i.e., how players born earlier during the same year of selection are physically advantaged, also exist (Rubajczyk & Rokita, 2020; Mohammed et al., 2025). These results support the idea of normalization scoring to reduce the bias of age in volleyball TID. Skills like serving accuracy, setting precision, spiking efficiency, and defensive coverage are the most crucial technical skills when it comes to playing competitive volleyball (Koopmann et al., 2020). De Waelle (2021) claimed that, along with perceptual-cognitive skills, such as anticipation and decision-making, is just as important in distinguishing elite youth players. In addition to this, Sgrò et al. (2024) also introduced a multidimensional volleyball TID model where the tactical knowledge would be seen as part of the salient aspects together with the physical fitness, exemplifying how various areas can compliment one another. Research in other sports can backup this inclusion: in basketball, a multidimensional model

that includes both measures of skill and measures of fitness were superior in predictive validity of future performance (Joseph et al., 2021; Khalaf et al., 2025; Omar et al., 2025); in soccer, this happened as well in a multi-dimensional model that included both measures of movement skill (agility/speed components) and measure of fitness (Larkin & OConnor, 2017). Recently, scientist have demanded statistically confirmed, evidence-based TID models that are data driven. Pino-Ortega et al. (2021) showed that using principal component analysis in team sports allows one to single out the most important performance variables and minimize redundancy and streamline the whole process. In the same sense, Tsoukos et al. (2019) revealed that upper and lower body power were highly predictive of volleyball choice, which validates the regression-based model to predict performance. In spite of such developments, a large number of the available tests of volleyball remain non-rigorously validated (either by exploratory factor analysis or inter-rater reliability information) (Koopmann et al., 2020). The dual-dimensional evaluation tool will be proposed in this research to solve this gap by utilizing effective psychometric methodologies that will meet the standards of reliability and construct validity.

Outside the field of sport, examples of parallel processes to talent identification exist in the organizational sector, strategic decision-making, and cultural theory. The analysis of the systemic decision-making process under competitive pressure was conducted by Garner (1963) and Friedenber (1982), whereas Satloff (2004) and Wang (2024) discussed strategic communication in high-stakes settings. Such comparisons can be used when speaking of talent scouting since choices in this area should be based on both empirical data and long-term prospects. On the same note, Hult (2007) and Tornatore (2013) emphasize the relevance of personal development, versatility and resilience as a means of success in artistic and cognitive industries, which apply in the environment of elite sports as well. Kelly et al. (1985) and Roberts (1949), in turn, remind us of the psychological assessment and support in development which has been playing a crucial role in how the identified talent can be optimized in the long run.

Research Gaps in the Current Talent Identification in Volleyball

The value of physical and technical metrics has been already established by existing literature as important for players of various levels (Hajilou & Anbarian, 2023; Koopmann et al., 2020). However, there is still a lack of validated and, in particular, volleyball-relevant tools that measure both dimensions of assessments simultaneously in one coordinated system (Hajilou & Anbarian, 2023). Practices are usually copied in other sports without any regard to biomechanical and tactical requirements of volleyball (Farley et al., 2020; De Waelle, 2021). This gap underpins the aim of the study described here, namely the provision of a statistically validated, two-dimensional TID tool uniquely used to assess the quality of youth volleyball with the inclusion of physical performance, technical skill, and cognitive variables into a scalable as well as evidence-based framework.

Methodology

In order to follow methodological rigor, the study was guided in a structured process in terms of initiating the research by comprehensively outlining the scope and operationalizing the key variables of interest. This model was based on the current literature

about multidimensional identification of talents and modified to the needs of volleyball. Methodology was chosen to strike a balance between ecological validity, in other words keeping the playing conditions realistic, and experimental control over the measurement procedures to make the results accurate and reproducible (Ali et al., 2024; Hammood et al., 2024; Mohammed Hammood et al., 2025). Providing the combination of quantitative and observational factors, the methodology helped perform the thorough assessment of the proposed Dual-Dimensional Evaluation Tool and, at the same time, statistically validate its components.

In order to improve clarity, Figure 1 shows the workflow procedure that has been applied in this study to develop and pilot-test in addition to validation of the Dual-Dimensional Evaluation Tool. It is a flowchart that describes the consecutive steps explaining how the researchers and practitioners of the future could repeat the process and find transparency and reproducibility.

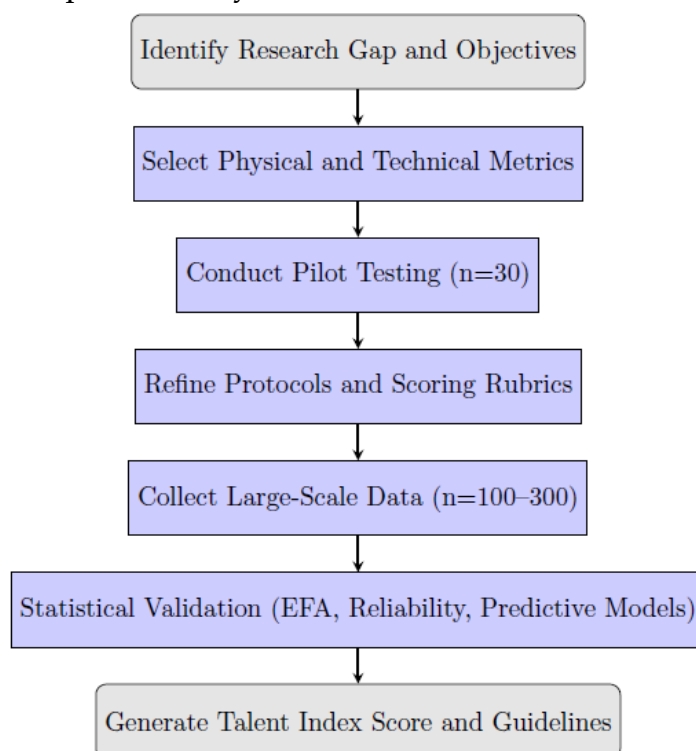


Figure 1: Workflow of the Dual-Dimensional Evaluation Tool Development and Validation Process

Research Design

The study used quantitative and observational research design and cross-sectional with longitudinal data collection allowed providing both immediate validity and prediction of the given tool proposed (Abdullateef AbdulJabbar et al., 2025; Hussein Fayyad et al., 2025). The research was divided into three stages, which followed one another:

1. Tool Development -identification of appropriate performance measures towards youth volleyball relying on literature and consultation expertise.
2. Pilot Testing- its initial implementation on a limited scale of ~30 subjects- in order to work on the protocols.

3. Longitudinal Assessment & Validation- broad scale use to determine psychometric properties and predictive validity thru out a competitive season.

Participants

- Sample size: N = 100 300 youth volleyball players.
- Age: 12-18 years.
- Gender representation: Equal male and female representation of the athletes.
- Experience: Many levels, starting with the novice all the way up to the competitive level club players.
- Recruitment locations: Secondary schools, sports schools and volleyball clubs.
- Inclusion criteria: It is necessary to participate actively in organized volleyball training (minor partisans no more than 2 times a week) at least 6 months.
- Exclusion criteria: Injury at present that would not allow taking of the test.

Both parental consent and participant assent were taken, and the research managed to follow the Declaration of Helsinki when conducting an ethical research involving minors.

Tool Development: Dual-Dimensional Evaluation Framework

The tool included two dimensions:

a. Physical Dimension Metrics

The physical aspect of the assessment instrument addresses the elements that have been extensively associated with programs of volleyball (the power, speed, agility, and the upper-body strength) evaluation. The tests of the choice have been found due to their practical application in past studies and its applicability in a youth development context. Individual measures are standardized to allow a comparable measure among the participants where the performance is recorded in objective units, which is less likely to cause bias in scoring.

Table 1: Physical Performance Tests and Their Measurement Criteria

Test	Purpose	Measurement Unit
Height & Reach	Anthropometry	cm
Standing Long Jump	Explosive lower-limb power	cm
10 m Sprint	Acceleration speed	seconds
Vertical Jump (arm swing)	Jumping ability	cm
T-Test or 505 Test	Agility/change of direction	seconds
Handgrip Strength	Upper-body isometric force	kgf

b. Technical Skill Metrics

The technical aspect analyses the ability that has direct impact on match outcome such as accuracy in serving, precision in setting, ability to cover the defense and effectiveness in attack. Such tests were devised to simulate typical game settings, which imply that outcome measures of the performance will be more reflective of competitive needs. Clear-cut rubrics (or quantitative numerical tallying) are used to record the scores so that they can be evaluated consistently by other assessors.

Table 2: Technical Skill Tests and Corresponding Scoring Systems

Test	Purpose	Scoring System
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Underhand	Serve	Serving skill	Hits on target / attempts
Accuracy			
Overhead Pass to Target		Setting ability	Hits on target / attempts
Dig Test		Defensive skill under pressure	Successful digs / attempts
Spike Targeting Drill		Attacking precision	Hits on target / attempts
Game Simulation Score		Tactical and game intelligence	Standardized coach rating

Data Collection Procedures

1. Environment: enclosed court with standardized facilities.
2. Standardization of Protocols: The tests would be delivered by trained assessors; use of same warm-up procedures among the subjects.
3. Video Recording: All technical skill tests have been video recorded so that there can be independent scoring by two qualified volleyball coaches.
4. anonymization: Unique ID is given to each athlete, personal identifiers are put in another file.
5. Digital Recording: All results are recorded in an insured database in order to analyze.

Scoring System

To put each test score (x₁) in its age group normal form:

$$z_i = (x_i - \mu) / \sigma$$

(1)

where:

- μ = mean score for the age group
- σ = standard deviation for the age group

The TIS was a weighted sum of the Talent Index Score:

$$TIS = 0.6 \cdot Technical + 0.4 \cdot Physical$$

(2)

where:

- Technical = mean normalized human factor technical test
- Physical: - mean normalized physical test score

Statistical Validation Procedures

After all the physical and technical tests were administered, the statistical validation processes were provided to evaluate reliability, validity, and predictive abilities of the tool. The validation was specifically meant to ensure that the chosen metrics effectively portray two different complementary dimensions of performance and that the combination of such metrics will serve as a relevant measure of the potential talent. This step-wise process involved factor analysis in analysing construct validity, internal consistency test to ascertain reliability and predictive modeling to analyze the correlation between the baseline scores and competitive outcomes.

a. Exploratory Factor Analysis (EFA)

EFA was performed to confirm the hypothesized situation with the two factors (Physical and Technical). The method of the extraction of factors was Principal

Axis Factoring with Varimax rotation. The suitability was determined using Kaiser-Meyer-Olkin (KMO) and Bartlett Test of Sphericity:

- KMO Threshold at or above 0.70
- Bartlett's χ^2 : $p < 0.05$

3.6.2 Internal Consistency

Cronbach's Alpha (α) was calculated for each dimension:

$$\alpha = (k - 1) / k [1 - (\sum_{i=1}^k \sigma_i^2) / \sigma_t^2] \quad (3)$$

where:

- k = items in the dimension
- σ_i^2 = variance of item i
- σ_t^2 = total variance of summed scores

Threshold: $\alpha \geq 0.80$ indicates high reliability.

b. Inter-Rater Reliability

Rating of technical skills; ratings of two independent coaches were compared using the Intraclass Correlation Coefficient (ICC):

$$ICC = (MS_B - MS_W) / (MS_B + (k - 1) MS_W) \quad (4)$$

where:

- MSB = between-subjects mean square
- MSW = mean square within subject
- k = number of raters

c. Predictive Validity

There was a hypothesis that baseline Physical and Technical scores predicted season performance:

$$Performance_{end} = \beta_0 + \beta_1 (Physical) + \beta_2 (Technical) + \varepsilon \quad (5)$$

d. Correlation Analysis

There were physical and technical scores measured by Pearson Correlation coefficient (r):

$$r = (\sum(X - \bar{X})(Y - \bar{Y})) / (\sqrt{(\sum(X - \bar{X})^2 \sum(Y - \bar{Y})^2)}) \quad (6)$$

e. Pilot Study Adjustments

The tool was tested prior to wide implementation by using 30 athletes. According to the comments:

- Some of the exercises were adapted to further clarity and interaction.
- Scoring rubrics were modified in ways that increase sensitivity in assessing levels of performance.

Standard residency schedules (hours and time off).

Result and Discussion

The first step of analysis was the descriptive characterization of the sample of participants in order to determine the demographic and performance characteristics of the study group. This was complemented by statistical analyses that sought to test the

dimensionality of the tool, its internal consistency as well as the determination of its predictive validity. The findings are reported in a logical order where the sample characteristic is discussed, followed by factor analysis, reliability statistics, and regression analysis and then the discussions are integrated where the findings are discussed according to existing literature.

Participant Characteristics

Table 3 includes descriptive statistics of the study sample: N = 210; 52 percent of females and 48 percent of males.

Table 3: Descriptive characteristics of participants

Variable	Mean ± SD	Min	Max
Age (years)	15.1 ± 1.8	12	18
Height (cm)	170.4 ± 8.6	154	192
Weight (kg)	62.3 ± 10.1	45.5	85.0
Volleyball experience (years)	3.6 ± 1.9	0.5	8

To see the physically and technically competency balance between varied development tasks, Figure 2 represents the allocation of normalized scores in terms of age groups. This gives us an idea of the trends that are present with age and more importantly whether some age groups possess undue advantages in one area compared to the other.

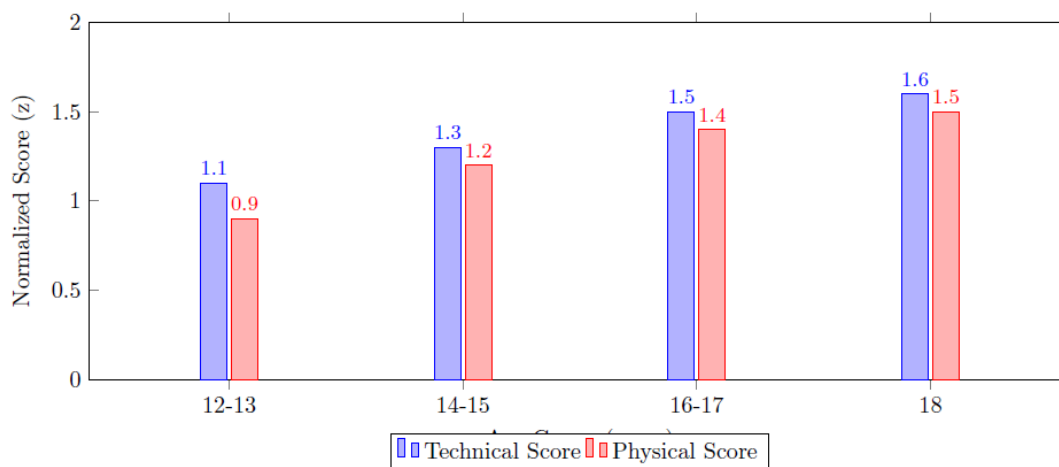


Figure 2: Distribution of Normalized Physical and Technical Scores by Age Group

Factor Structure

The Kaiser–Meyer–Olkin measure verified sampling adequacy (KMO = 0.842) and Bartlett’s Test of Sphericity was significant ($\chi^2(45) = 682.45, p < 0.001$).

Exploratory Factor Analysis showed a distinct 2- factor solution (Physical and Technical dimensions) with 72.3 of total variance (Table 4).

Table 4: Factor loadings after Varimax rotation

Test	Physical Factor	Technical Factor
Height & Reach	0.81	0.12
Standing Long Jump	0.84	0.10
10 m Sprint	-0.78	0.15

Vertical Jump	0.86	0.14
Agility Test	-0.74	0.21
Serve Accuracy	0.09	0.83
Setting Precision	0.13	0.87
Defensive Dig Success	0.16	0.81
Spike Targeting	0.14	0.85
Game Simulation Score	0.18	0.79

Note: Loadings on sprint and agility are negative meaning faster time associated with better performance.

Reliability Analysis

- Physical dimension: $\alpha = 0.87$
 - Technical dimension: $\alpha = 0.89$
- Both exceeded the $\alpha \geq 0.80$ threshold, indicating high internal consistency.

Inter-rater reliability for technical skill scoring was excellent (ICC = 0.91, 95% CI [0.88, 0.93]).

Correlations Between Dimensions

Pearson correlation indicated a positive moderate correlation between the composite scores of Physical and Technical ($r = 0.42, p < 0.001$) indicating physical and technical to be related; however, the two dimensions do not measure the same aspect of performance. The association between composite Physical and Technical scores is depicted in figure 3. The moderate positive relationship found proves the assumption that the domains become related though they reflect different aspects of player performance.

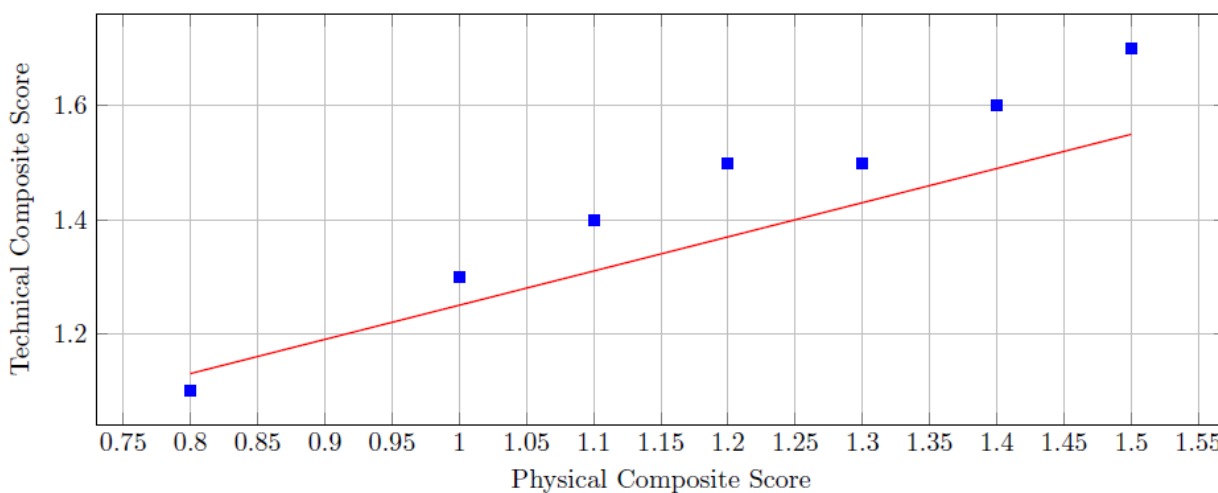


Figure 3: Scatterplot of Physical vs. Technical Composite Scores

Predictive Validity

Regression analysis demonstrated that both Physical ($\beta = 0.34, p < 0.001$) and Technical ($\beta = 0.52, p < 0.001$) scores significantly predicted end-of-season performance ratings ($R^2 = 0.56, p < 0.001$).

Table 5: Regression model predicting season performance

Predictor	β	SE	t	p
Physical Score	0.34	0.06	5.67	<0.001
Technical Score	0.52	0.05	10.40	<0.001
Constant	1.12	0.41	2.73	0.007

Discussion

The current study not only succeeded in establishing a Dual-Dimensional Evaluation Tool to identify youth volleyball talent but also in validating the same. The results are supportive of the ideas that the physical capabilities that include anthropometry, power and agility as well as technical skills which are composed of serving, setting, digging, spiking, and the tactical play are important in predicting competitive performance.

This structure detailed the two-factor could be aligned with previous studies on the topic of Hajilou & Anbarian (2023), and Tsoukos et al. (2019) that have highlighted the complementary but distinct aspect of physical and technical skills in volleyball talents pathways. The values of Cronbach alpha are high in both dimensions, and this demonstrates the internal consistency of the tool, which is close to reliability marks of other multidimensional sports evaluation studies (Farley et al., 2020; Koopmann et al., 2020).

The correlation between Physical and Technical scores is moderate, tendentiously confirming that although physically talented players might have a head start, technical virtuosity requires a certain type of training hence the multidimensional measurement frameworks promoted by Sgrò et al. (2024) and Joseph et al. (2021).

Regression outcomes revealed that technical performance had better predictive worth than physical qualities on the ultimate performance during the season. It can be described in line with Rubajczyk & Rokita (2020) who noted that in match-related situations, precision appears more significant than unpolished physical abilities.

In practical terms, the Talent Index Score provides coaches with a measurable coefficient that will help to select the athletes and develop the elite levels at a long-term perspective. Furthermore, the weighting (60% technical, 40 percent physical) reproduces competitive real-life needs, as in the world competitive matches are most often decided by the ability to perform under stress.

The weakness is the fact that the follow up lasted only a season and measurements of psychological or cognitive factors were not taken that De Waelle (2021) found could be significant to elite performance. In the future, it will be possible to use perceptual-cognitive testing (Pino-Ortega et al., 2021), and follow the results over time and seasons.

To sum it up, the measure tool would help fill a methodological gap in talent identification in volleyball as it has good measurement protocols, robust psychometric processes and high predictive validity; therefore, it would be an advantage to sports academies and clubs, and to national federations.

Conclusion

The research came up with the creation, validation and testing of a Dual-Dimensional Evaluation Tool used in identifying talent in the youth volleyball, which combines physical and technical performance measurement methods, into one common, standardized measure. The findings revealed that the instrument has good psychometrics with high internal reliability, high inter-rater reliability as well as a clearly established two-dimensional structure. Moreover, both dimensions anticipated competitive performance greatly with the technical proficiency standing much stronger than physical qualities. Coaches, scouts and sports development programs are the direct beneficiaries of the findings. The tool may provide all decision-makers with a reliable, objective way of assessment to know the promising new players at an early stage, to direct targeted training interventions, and facilitate evidence-based selection activities. The elevation of technical competences compared to physical abilities matches the needs of competitive volleyball matches, in the ethos of which tactical penetration and tactical sharpness, the knowledge of how to act and the ability to respond to new situations immediately and instantly, sometimes overshadow physical abilities. In addition to everyday usage, this research contributes to scientific knowledge of models of the multidimensional identification of talent in team sports. It is consistent with and complementary to earlier studies in providing a validated methodology tailored to volleyball, covering a gap in standardization and prediction abilities that has existed. Even then, the study is not without limitations. Lack of cognitive, psychological and perceptual variables implies that the tool exhibits lack of inclusion covering all the attributes which can potentially affect the success of an elite volleyball player. In addition, long-term predictive validity cannot be assessed because of the limitation of the single-season follow-up. Future study needs wider scopes of performance measurement, consideration of various cultural and developmental situations, follow-up on athletes during competitive seasons over years in order to improve on and perfect the model. Altogether, Dual-Dimensional Evaluation Tool is the next milestone in volleyball talent identification on both methodological and practical levels. Its implementation may harmonize the evaluation across academies, clubs, and federations, which eventually promotes fairer and efficient processes of athlete development and advancement to the highest performance thresholds.

References

- Abdullateef AbdulJabbar, M., M. Ali, M., Ali Khalaf, Y., Hadi Hammad, S., Khalid Awad, A., Jaber Mushref, A., & Adham Ali, O. (2025). El efecto del entrenamiento mental (visualización mental y enfoque de atención) en la precisión y velocidad del rendimiento ofensivo en jugadores de esgrima. *Retos*, 70, 1097-1113. <https://doi.org/10.47197/retos.v70.117026>
- Ali, O. A., Mushref, A. J., Hummadi, J. N., & Awad, A. (2024). The effect of a proposed training curriculum to develop some special physical abilities and the accuracy of the movement scoring skill for the Ramadi football club players | El efecto de un plan de estudios de entrenamiento propuesto para desarrollar algu. *Retos*, 61, 193–200. <https://doi.org/10.47197/retos.v61.107271>
- Berwick, B. E., & Oppenheimer, C. (1971). Marriage Pregnancy and the Right to Go to School. *Tex. L. Rev.*, 50, 1196.

- De Waelle, S. (2021). Inside the mind of the young volleyball player: the development of cognitive and perceptual-cognitive function (Doctoral dissertation, Ghent University).
- Farley, J. B., Stein, J., Keogh, J. W., Woods, C. T., & Milne, N. (2020). The relationship between physical fitness qualities and sport-specific technical skills in female, team-based ball players: a systematic review. *Sports medicine-open*, 6(1), 18.
- Friedenberg, E. S. (1982). Jaws III: The Impropriety of Shark-Repellent Amendments as a Takeover Defense. *Del. J. Corp. L.*, 7, 32.
- Garner, W. R. (1963). The subjective prestige factor in the diplomatic milieu of the Chaco War: a case study in systems analysis. Tulane University.
- Hajilou, B., & Anbarian, M. (2023). Investigate the Most Important Characteristics of Elite Volleyball Players for Sports Talent Identification. *Journal of Advanced Sport Technology*, 7(4), 1-10.
- Hammood, Y. M., Awad, A. K., Ali, O. A., Mushref, A. J., & Hummadi, J. N. (2024). Measuring the aggressive behavior of the teams in the Iraqi Premier League in football and its relation to the results and ranking of the league for the 2022-2023 season. *Sportske Nauke i Zdravlje*, 14(2), 127–134. <https://doi.org/10.7251/SSH2402127H>
- Hult, R. A. (2007). *Agnosticity Volume 2: An Agnostic View of Bothersome Mormon Doctrine* (Vol. 2). Trafford Publishing.
- Hussein Fayyad, F., saadallah kamees, I., Mohammed Hammood, Y., Adham Ali, O., Jaber Mushref, A., Khalid Awad, A., & Shanta, A. (2025). Construir y legalizar una prueba para medir el nivel de agilidad futbolística de los jugadores jóvenes. *Retos*, 68, 1578-1590. <https://doi.org/10.47197/retos.v68.116368>
- Joseph, J., McIntyre, F., Joyce, C., Scanlan, A., & Cripps, A. (2021). A comparison of multidimensional qualities discriminant of selection in elite adolescent Australian basketball athletes. *Plos one*, 16(8), e0256032.
- Kelly, G. A., Jackson, T. T., Zelhart, P. F., & Markley, R. P. (1985). *The Handbook of Clinic Practice*.
- Khalaf, Y. A., AbdulJabbar, M. A., & Ali, O. A. (2025). The effect of sports job burnout on the performance of workers in student activities departments in Iraqi universities | El efecto del agotamiento laboral deportivo en el rendimiento de los trabajadores de los departamentos de actividades estudiantiles de. *Retos*, 66, 86–95. <https://doi.org/10.47197/retos.v66.113271>
- Koopmann, T., Faber, I., Baker, J., & Schorer, J. (2020). Assessing technical skills in talented youth athletes: a systematic review. *Sports Medicine*, 50(9), 1593-1611.
- Larkin, P., & O'Connor, D. (2017). Talent identification and recruitment in youth soccer: Recruiter's perceptions of the key attributes for player recruitment. *PLOS one*, 12(4), e0175716.
- May, L. (1998). *Masculinity & morality*. Cornell University Press.
- Mohammed Hammood, Y., Hussein Rashid, A., & Adham Ali, O. (2025). The effect of a proposed training method using play exercises to develop specific agility and skill performance in football | El efecto de un método de entrenamiento propuesto que

- utiliza ejercicios de juego para desarrollar la agilidad específica y el re. Retos, 63, 719–728. <https://doi.org/10.47197/retos.v63.111095>
- Mohammed, K. J., Suleiman, K. I., Naser, M. M., Ali, O. A., & Ali, O. (2025). The effect of colorful and varied visual skill exercises on the development of sensory perception and complex skill performance among futsal players. *Retos*, 69, 1226-1239. <https://doi.org/10.47197/retos.v69.113248>
- Naremore, J., & Brantlinger, P. M. (Eds.). (1991). *Modernity and mass culture*. Indiana University Press.
- Oliveira, J. P., Marinho, D. A., Jacinto, P., Sampaio, T., & Morais, J. E. (2025). Characterization of physical performance and change of direction deficit across age groups in young female volleyball players. *BMC Sports Science, Medicine and Rehabilitation*, 17(1), 209.
- Omar, A. F., Hammadi, W. K., Moseekh, L. Z., Muhammad, K. M., Saleh, M. M., & Ali, O. A. (2025). The impact of cognitive training on field intelligence growth and some composite skills of advanced football players | El impacto del entrenamiento cognitivo en el crecimiento de la inteligencia de campo y algunas habilidades compuestas de los jugadores d. *Retos*, 66, 46–58. <https://doi.org/10.47197/retos.v66.113234>
- Phoutchanthavongsa, S. (2019). *Lesbian, gay, bisexual, and transgender (LGBT) disclosure among the Global Fortune 250 companies—An exploration* (Doctoral dissertation, Auckland University of Technology).
- Pino-Ortega, J., Rojas-Valverde, D., Gómez-Carmona, C. D., & Rico-González, M. (2021). Training design, performance analysis, and talent identification—A systematic review about the most relevant variables through the principal component analysis in Soccer, Basketball, and Rugby. *International Journal of Environmental Research and Public Health*, 18(5), 2642.
- Roberts, E. M. (1949). *Mental health clinical services; a study of the children between 6 and 12 years of age examined by mental health clinics in Vancouver from 1945 to 1947 inclusive* (Doctoral dissertation, University of British Columbia).
- Rubajczyk, K., & Rokita, A. (2020). The relative age effect and talent identification factors in youth volleyball in Poland. *Frontiers in Psychology*, 11, 1445.
- Sagalyn, L. B. (2003). *Times Square roulette: Remaking the city icon*. MIT Press.
- Sarmiento, H., Anguera, M. T., Pereira, A., & Araújo, D. (2018). Talent identification and development in male football: A systematic review. *Sports medicine*, 48(4), 907-931.
- Satloff, R. (2004). *The battle of ideas in the war on terror*. Washington, DC: Washington Institute for Near East Policy.
- Sgrò, F., Quinto, A., Lipoma, M., & Stodden, D. (2024). A multidimensional approach to talent identification in youth volleyball through declarative tactical knowledge and functional fitness. *Journal of Functional Morphology and Kinesiology*, 9(1), 29.
- Smith, S. W. (1986). *The segregation of girls in mathematics*. Sheffield Hallam University (United Kingdom).
- Sodaitis, B. (2020). *Relation between anthropometric, physical, technical testing and game-related statistics in youth basketball players* (Doctoral dissertation, Lietuvos sporto universitetas.).

-
- Tornatore, G. (2013). *Becoming a "jazzperson": Moving beyond sounds and tones* (Doctoral dissertation, Teachers College, Columbia University).
- Tsoukos, A., Drikos, S., Brown, L. E., Sotiropoulos, K., Veligeas, P., & Bogdanis, G. C. (2019). Upper and lower body power are strong predictors for selection of male junior national volleyball team players. *The Journal of Strength & Conditioning Research*, 33(10), 2760-2767.
- Wang, F. Y. (2024). *The art of state persuasion: China's strategic use of media in interstate disputes*. Oxford University Press.
- Warren, A. (1993). *Urban Regeneration in the 1990s: A review of the City Challenge initiative*. University of London, University College London (United Kingdom).
- Williams, A. M., Ford, P. R., & Drust, B. (2023). Talent identification and development in soccer since the millennium. *Science and football*, 3-14.
- Zemková, E., & Hamar, D. (2018). Sport-specific assessment of the effectiveness of neuromuscular training in young athletes. *Frontiers in physiology*, 9, 264.