Research on the Shift of Youth Basketball Level Assessment in China from "Event-Based Grading" to "Skill-Based Level Testing"

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Abstract: *The method of assessing youth basketball level in China has been using event-based grading where the result of competitions was the main assessment basis for a long period of time. Because of the limitation due to insufficient event supply and role differentiation in team events, it's difficult to cover the whole process of youth skill development. Skill-based level testing based on criterion-reference and competency concept breaks down the comprehensive basketball ability into measurable and assessable skills and sets up a standardized certification system through setting level thresholds. We compare the internal logic, practical limitations and coupling relationships of two assessment paradigms in this paper, construct a hierarchical and categorized framework, an indicator screening logic and a dynamic threshold adjustment mechanism for the skill-based level testing standard system; clarify the matching relationship between assessment methods and youth motor ability development, at the same time, build an operational guarantee system from the levels of multi-stakeholder collaboration, platform data mutual recognition and full-process quality monitoring, providing theoretical explanations and institutional design references for the reform of youth basketball level assessment.*

Keywords: *youth basketball; level assessment; event-based grading; skill-based level testing; standard system; quality assurance*

Introduction

The abilities identification, training feedback and tiered organization function of the youth basketball level assessment that determine the direction of skills' development according to its assessment basis; Based on events (competition ranking or head-to-head result), with relatively high context authenticity but due to constraints from event supply, periodic rhythm and team structure, it is hard to record all improvement of skills, limiting the accuracy of training feedback; Skill-based level testing based on criterion-referenced and competency-based principle includes non-event participants, shows the sequence of skill development, provides periodic and comparable level signals: There is a whole change in terms of paradigm's assessment focus, standard structure and certification connection. Clarify the conversion condition and coupling relationship between these two paradigms, construct a measurable, repeatable, and commensurable skill standard system, and design mechanisms for stakeholders' cooperation, mutual recognition of information, and quality monitoring, maintaining the validity, reliability, and comparability of level signal, providing a theoretical basis for constructing skill-based level testing standards and operational systems.

1. Paradigm Composition and Shift Logic of Youth Basketball Level Assessment

1.1 Assessment Logic and Structural Constraints of Event-Based Grading

The basis of Event-based grading lies on competition results; The logic of evaluation is based on the correlation between competition performance and ranking structure. All level signals including competition tier, opponent level, match results and individual contribution has been institutionalized as a condensation of competitive performance. Relatively high degree of contextual authenticity, prominent comprehensive competitive characteristics and intuitive result discrimination could reflect the immediate decision making and coordination ability of athletes facing complex tactical environment. Role differentiation of basketball as a team event embedding individual performance into

the team structure, so level signals will also bear positional function, playing opportunity and tactical weight, limit individual independence of assessment results.

Event supply, periodic rhythms, evidence separability (eligibility, schedule density, regional event distribution, and team formation determine opportunity to get levels) – Structural constraints Level generation processes: Time mismatches in competition nodes, Continuity of skill development Single-match condition, Injury, Officiating standards, Accidental factors – Involvement in the level generation process Skill improvement, Physical fitness change, Cognitive growth can't be measured continuously out of competition periods Event regulations and Ranking structure – Basis for level awarding No independent measurement space for skill dimensions Assessment results doesn't provide enough fine-grained information for training feedback Event-based grading has the structural features of terminal screening and relative evaluation.

1.2 Assessment Logic and Functional Positioning of Skill-Based Level Testing

The principle of skill-based level testing is criterion-reference and competency-based. It decomposes basketball ability into skill units that can be measured and develop step by step. Technical movements, combined application, physical performance, tactical cognition, and contextual decision-making form structured standards with level thresholds. The assessment tasks take place in relatively stable conditions and levels are generated according to whether they reach such standards. Logic of assessment emphasizes the reproducibility of evidence, openness of standards, and comparability of levels: Shift of the assessment object from competition rankings to skill development levels, shift of the assessment timing from event nodes to periodic testing, shift of level generation from relative ranking to absolute attainment. Functional position portrays the skills' development sequence, gives feedback on the training process, covers non-event participants, and supplies information support for tiered teaching and training organization. Level becomes an independent certification of an individual's skill status, assuming the role of a foundational, process-oriented, and universal skill reference. Competition system retains the function of verifying high-level confrontation and comprehensive competitive performance. Technical requirements of skill-based level testing emphasize standard validity, assessment reliability, inter-rater consistency, and setting up level boundaries; functional realization depends on the close correspondence between the standard system and assessment procedures, level results need interpretative stability under different venues, equipment, and scoring conditions.

1.3 Conversion Conditions and Coupling Relationship Between the Two Assessment Paradigms

Significant difference exists on aspects such as assessment object, source of evidence, time structure, organizational model, function etc. between event-based grading and skill-based level testing. There are four conditions required by the whole paradigm change: measurable skill indicators, reproducible assessment procedure, comparable level boundaries, and multi-stakeholder collaboration for evaluation. We need to transform basketball ability into implementable assessment indicators which can have a stable assessment result under different scenarios; establish correspondence between skill levels and competition tiers, break down the information monopoly of one event organization while simultaneously collecting two types of evidence (skill assessment and competition performance)[1].

Neither substitutive or opposite but coupled and complementary: one (event-based grading), completing the realistic verification of high-level confrontation ability; another (skill-based level testing), outputting a basic ability profile which is the basis of tiering competitions' participation. Bidirectional calibration exists in both types of results – competition data tests the discriminative power and predictive effect of skill standards while skill assessment results explains the ability foundation of competition performance. One kind of result (skill-based level testing) records long-term growth trajectory, other (event-based grading) verifies the comprehensive competitive level at a certain stage. Essence of such shift is building a new assessment architecture with "skill standards serve as the underlying foundation, competition verification serves as high-level supplementation, mutual recognition of levels serves as the link" out of the model that only rates by event results, achieve comprehensive certification of multidimensional abilities.

2. Structured Construction of the Standard System for Youth Basketball Skill-Based Level Testing

2.1 Hierarchical Classification of Skill Dimensions and Indicator Extraction

The hierarchical classification of skill dimensions is determined according to the structure of basketball ability and its pattern of development among youth. Stratification vertically separates level intervals through age stages, training years and skill development level into a progression: from basic movement control to combined technical application; from individual skill execution to collective tactics coordination. Horizontal division of dimensions is made by technique, physical fitness, tactical cognition, and contextual decision making. The former include movements such as dribbling, passing, shooting, defensive movement, and rebounding. The latter include elements including speed, agility, coordination, and endurance. Tactical cognition includes spatial recognition, cooperative selection, and offensive-defensive transition. Contextual decision-making includes selection and execution in confrontational conditions. Intersection between stratification and classification forms a skill matrix which gives structured coordinates to describe levels [2].

Indicator extraction: movement patterns, combined techniques and confrontational application; screening of indicators according to sport characteristics; development patterns, observability and assessability. The focus is on basic posture, force generation sequence, movement trajectory and control precision with respect to movement pattern, movement connection, rhythm variation and left-right side balance with respect to combined technique, technical stability in defense pressure, time constraints and spatial limitations with respect to confrontational application. Indicators must contain both individual skills and collective coordination that do not fully bind level signals to competition rankings or team results. Weights for indicators are mapped from indicator pool, skill dimensions and level intervals which enables clear orientation towards abilities when describing levels.

2.2 Basis for Determining Level Thresholds and Dynamic Adjustment

Level thresholds integrate criterion- and norm-reference methods where the key parameters include: movement difficulty, task complexity, spatiotemporal constraints, completion quality and decision-making rationality when setting up thresholds. Adjustments need to be made for different ages, skill-sensitive periods and training years to achieve a consistent understanding among age groups; defining attainment criteria per dimension is required to distinguish true skill level versus participation experience. Consistency of scoring and assessment environment should be critically considered as minimizing level biases caused by venues, equipment or human scoring.

Establish dynamic adjustments to optimize standards based on distribution of assessment data, scoring consistency, task difficulty and competition verification feedback. Achieve iterations by revising level descriptions, fine tune difficulty parameters, calibrate level boundaries adapting to the pace of youth's ability development. Adjustments should maintain historic levels' interpretability; avoid arbitrary changes to core dimensions; keep enough flexibility so that skill-based level testing not just reflect differences in developmental stages, but preserving level commensurability over time and groups.

2.3 Correspondence Between Assessment Methods and Motor Ability Development

Correspondence between assessment methods and development of motor ability can be seen from three aspects: structural correspondence, temporal correspondence, and functional correspondence. In terms of structural correspondence, assessment tasks must correspond with skills (closed movement assessment corresponds to basic movement programs; combined technique assessment corresponds to movement linkage and rhythm control; situational simulation corresponds to spatial recognition and decision-making selection; game observation corresponds to comprehensive confrontation and collaborative execution), in terms of temporal correspondence, assessment methods must correspond with the order of youth development (in early stage emphasize on movement control, coordination, and agility; in middle stage emphasize on combined techniques, confrontational application, and physical fitness development; in later stage emphasis on tactical decision-making, position-specific training, and game reading). Assessment methods need to assume diagnostic function, feedback function, and certification function respectively, no single assessment task should be responsible too much for level interpretation[3].

Standardization and contextualization of assessment methods: Standardization provides reproducible level results and inter-rater consistency; contextualization guarantees ecological validity of skill performance and the decision-making part. Development of assessment tasks is performed under controlled cognitive load, confrontation intensity and time pressure ensuring distinct task features within different level intervals. Interpretation of assessment results includes integration of scores on skill dimensions, attainment of level thresholds as well as developmental trajectory information providing a multidimensional description of the state of motor ability development. Correspondence between assessment methods and motor ability development shows the developmental function of level certification - thus, skill-based level testing constitutes a structured tool for recording the growth of youth basketball ability.

3. Operational Mechanisms and Quality Assurance of Youth Basketball Level Assessment Under the Orientation of Skill-Based Level Testing

3.1 Functional Boundaries and Collaboration Mechanism of Multiple Assessment Entities

Multiple assessment entities exists such as: skill standard-setting institutions, assessment implementation institutions, level certification institutions and competition verification institutions which respectively play a role of standard development, assessment execution, level awarding and high-level calibration. Standard-setting institution divides skills dimension, sets level threshold and designs assessment task; Assessment implementation institution controls assessment condition, trains rater and executes on-site procedures; Level certification institution reviews level results, manages certification record and issue level certificate; Competition verification institution collects competition performance information and calibrate validity of skill standards. Divide functional boundary by professional competence, procedural responsibility, and information authority to avoid integration of standard setting with assessment implementation resulting in loosening standards and integration of level certification with assessment implementation resulting in procedural formalism. Professional division of labor between assessment entities establish mutual constraint among standard development, procedure execution and result certification, each has functional independence based upon information asymmetry, so that it can establish an organization basis for objective level signal.

Above collaboration mechanism relies upon information exchange, procedural linkage, and joint calibration: The standard-setting institution gives out scoring rules and task parameters to the assessment implementation institution; the assessment implementation institution sends over original scoring records along with description of assessment condition to the level certification institution; Competition verification institution feeds back competition performance data to the standard-setting institution for threshold calibration. This collaboration mechanism requires setting up a channel of dispute handling so as to provide pathway for procedure responses when there exist scoring discrepancies or level appeals, or disputes about interpreting standards. And it requires specification of information authority and responsibility between assessment entities. Retention of raw data, traceability of scoring records, and records of level change will be the basic conditions for collaborative operation which ensures procedural transparency and accountability of level results among different entities. Efficiency of this collaboration mechanism depends on the degree of standardization of information transmission process and tightness of procedures – standardization of information interface and clarity of procedural node helps to reduce the cost of coordination among entities and improves the overall operational efficiency of level certification.

3.2 Information Platform for Level Certification and Mutual Recognition of Results

The Level certification information platform perform level record, data storage, result query and cross-system exchange. Platform architecture can store multi-dimensional records such as skill dimension score, attainment of level threshold, assessment condition parameter and rater information. Data structure design should be concise expression of level results but retain all assessment process (level certificates show attainment conclusion whereas the back-end system retain skill profile and assessment trajectory). Tiered permission is needed in assessment implementation institutions inputting raw data, level certification institutions reviewing and producing level results, and query end obtain corresponding information with permissions. Protection personal information, tamper-proofing of assessment data and long-term preservation of level records need data security which require establishing data verification, operation log, and backup and recovery mechanism from technical perspective. Modularized platform architecture enables level records, process data, and certification

information constitute a tiered storage structure: raw data layer retains on-site assessment information; certification layer produces level conclusions; query layer shows corresponding content according to permissions. Three-layer structure meet information needs under different usage scenario and ensure data integrity[4].

The Result mutual recognition refers to matching relationship of skill-based level testing levels and event-based grading levels and commensurability rules of level results among different assessment institutions. Conditions of mutual recognition: Equivalent assessment tasks, Consistent scoring standards, Control over assessment conditions and Parity of rater qualification. Rules of mutual recognition demands specifying interval correspondence and boundary conversion of levels without distorting level signals through simple numerical mapping. Data exchange between platforms requires a uniform data format and interface specification; Level records need accompanying with identification of assessment institution, Assessment time, Version of task and rater information so that recipient can decide if the level results are comparable or not. Expansion of result mutual recognition is dependent on the degree of openness of the standard system and the degree of transparency of assessment procedures; level certification changes from being an internal record within one institution into cross-institution verification of certification signal. Establishment of the mutual recognition mechanism will make level results be traceable, verifiable and comparable information unit across different assessment systems but still keep interpretive consistency and certification credibility when circulating cross-institutions.

3.3 Risk Identification and Quality Monitoring in the Shift Process

Risks in the shift: standard drift, assessment alienation, level inflation, evidence distortion. Deviation of assessment task difficulty and level thresholds from original skill dimensions is standard drift; emphasizing easy-to-measure indicators but neglecting contextual decision-making and confrontational application is assessment alienation; emphasis on high levels by lowering the threshold attainment standards is level inflation; lack of inter-rater consistency or lax control of assessment conditions resulting in deviation of level signals is evidence distortion. It needs all stages (standard setting, assessment implementation, level certification, result use) covered for risk identification along with establishing risk indicators and early warning thresholds. Systematic risk identification requires continuously tracking possible deviations at every stage – dimension coverage and threshold rationality are focused on in the standard-setting stage; procedural execution and condition control are focused on in the assessment implementation stage; review standards and record completeness are focused on in the level certification stage; level interpretation and feedback information are focused on in the result use stage, creating a full-process risk perception structure[5].

Quality monitoring includes: standard operation monitoring, assessment procedure auditing, inter-rater consistency testing, and level result calibration. Standard operation monitoring concentrates on monitoring level interval pass rate, score distribution for skills dimension, task difficulty parameter; Assessment procedure auditing concentrates on auditing venue/equipment condition, process execution, completeness of raw records; Inter-rater consistency testing is based upon inter-rater and intra-rater reliability indicator; Level result calibration uses competition performance data to test discriminant validity and predictive validity of skill levels. It needs establishment of a regular evaluation and feedback revision stage; Using monitoring results to fine-tune standards, train raters, optimize assessment tasks. The core of it maintains validity, reliability, and comparability of level signal; Closed-linkage between monitoring data, evaluation conclusion, and revision measure keeps correspondence with the rhythm of youth basketball ability development under continuous operation[6].

Conclusion

The transformation from "event-based grading" to "skill-based level testing" of youth basketball level essentially involves changing rating evidence, temporal logic, and certification functions: event-based grading is relative evaluation; skill-based level testing is criterion-referenced certification, that are complementarily coupled by bidirectional calibration. The standard system of skill-based level testing has the hierarchy classification of skill dimension as framework, movement pattern, combined technique, confrontational application as indicator levels, threshold set together with age and training years, using assessment data and competition feedback for dynamic optimization. Clarifying responsibility and authority among various entities at operation level is essential, realizing mutual recognition of result via information platform with tiered storage and unified interface, establishing

closed-loop quality control system via process auditing, scoring reliability test, and level verification. Coupling calibration mechanism between the two assessment paradigm needs further improvement in the future, mutual recognition rule and data specification need perfection, level assessment will go toward full certification of multidimensional abilities, giving a continuous, comparable, and interpretable evaluation reference for the growth of youth basketball skills.

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