

Research on the Innovative Model of Cultivating Referees' Judging Ability in Inline Hockey Under the Background of Digital Transformation — Taking the Application of Video Assistant Referee (VAR) Technology as an Example

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Abstract: Under the wave of digital transformation in the sports industry, as an emerging sport with both competitiveness and ornamental value, the standardized and professional development of inline hockey events has put forward higher requirements for referees' judging ability. As an important application of digital technology in the field of sports competition, Video Assistant Referee (VAR) technology provides a new path for cultivating referees' judging ability in inline hockey. Based on this, this paper studies the innovative model of cultivating referees' judging ability in inline hockey under the background of digital transformation, analyzes the existing problems, expounds its important implementation value, and puts forward corresponding implementation countermeasures, aiming to achieve the systematic and accurate improvement of referees' judging ability.

Keywords: Digital transformation; Inline hockey; Referees; Judging ability; VAR technology; Cultivation model

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1. Introduction

With the in-depth integration of digital technology and the sports industry, sports competition has entered a new era of "digital refereeing". Digital tools such as VAR technology have been widely used in mainstream events, effectively improving the accuracy and fairness of judgments^[1]. As an emerging sport integrating speed, skills and confrontation, inline hockey has developed rapidly in China in recent years, with the continuous improvement of event scale and competitive level. However, the problem of lagging construction of the referee team has become increasingly prominent, and phenomena such as non-standard refereeing and misjudgments occur from time to time, restricting the sustainable development of the sport. Digital transformation provides new opportunities for cultivating referees' judging ability in inline hockey, and VAR

technology can help referees accurately grasp the rules and standardize refereeing behaviors. Therefore, it is of great significance to construct a VAR technology-enabled cultivation model that fits the characteristics of the sport.

2. Existing problems in referees' judging ability in inline hockey

2.1. Insufficient professionalism in refereeing

The referee team of inline hockey in China is composed of part-time referees from universities, primary and secondary school teachers, club practitioners and practitioners in other industries across the country. Most of them lack systematic professional training; some referees are transformed from athletes and coaches and have not received standardized refereeing skill training. Referees without an athletic background cannot accurately grasp the refereeing process and judgment standards. Inline hockey is fast-paced and highly confrontational, which requires extremely high observation and judgment abilities of referees. Due to the lack of professional training, some referees have difficulty capturing key actions in high-speed movement, resulting in low judgment accuracy. For example, in some provincial-level events, referees have problems in judging "Charging" and "Interference".

2.2. Inaccurate mastery of rules

The competition rules of inline hockey are constantly updated and improved, but some referees fail to learn the latest rules in a timely manner and still use the old rules for refereeing, leading to judgment deviations. At the same time, the lack of a unified rule training and assessment mechanism results in differences in the understanding of rules among referees in different regions and levels, inconsistent refereeing standards, and the phenomenon of "different judgments for the same scenario". Some referees have a one-sided understanding of rules such as "High sticks" and "Slashing", fail to flexibly apply them in combination with the actual event scenarios, and do not standardize the implementation of rules in special links such as judgments and substitutions in the game. The inconsistent standards for action judgments, unsolid mastery of the details of competition rules, and vague areas in the judgment of marginal actions are likely to trigger event disputes.

2.3. Weak emergency response ability

Inline hockey events are highly confrontational, and emergencies such as athlete injuries, event conflicts and equipment failures are prone to occur. However, most referees lack experience and training in responding to emergencies, and improper handling is likely to lead to disorder of event order. Some referees cannot control the overall situation of the event, cannot adjust refereeing strategies according to the event rhythm, and cannot respond to public opinion disputes, further affecting the credibility of the event and the image of the sport^[2].

3. Important value of cultivating referees' judging ability in inline hockey in the background of digital transformation

3.1. Improving event credibility

Fairness and justice are important principles of all sports competitions, and the professional ability of referees is an important factor affecting their performance. Using information tools such as VAR to improve the ability of referees in the background of informatization can effectively ensure the accuracy and uniformity of judgments, thereby reducing the occurrence of missed judgments and misjudgments. VAR technology

can review and record the whole process of judgments, increase transparency, reduce disputes in the game, enhance the confidence of participants, coaches, and audiences in the event, and promote the development of the event level.

3.2. Promoting the popularization and development of the sport

The popularization and development of inline hockey cannot be separated from the guarantee of professional events, and the referee team is the core force. At present, the lagging construction of the referee team has become a restrictive factor for the popularization of the sport. It is necessary to strengthen the cultivation of their judging ability, build a professional and standardized referee team, and provide a guarantee for the orderly development of events. At the same time, the digital cultivation model can attract more enthusiasts to join the referee team, improve the talent training system, provide guidance for the development of the sport among teenagers, and reserve talents for the long-term development of the sport ^[3].

3.3. Enhancing industrial competitiveness

The competitiveness of a sport is not only reflected in the competitive level of athletes, but also in the professional degree of events. Strengthening the cultivation of referees' judging ability, introducing VAR technology to improve the professional level of refereeing, building high-quality event IP, attracting investment, technology and talent, and promoting the high-quality development of the inline hockey industry. At the same time, a professional referee team can promote the integration of China's inline hockey with international standards, enhance the international influence of the sport, and help build a strong sports country ^[4].

4. Innovative model of applying VAR technology to cultivate referees' judging ability in inline hockey under the background of digital transformation

4.1. Technology empowerment: Constructing a basic VAR technology training system to consolidate the foundation of judging ability

Combined with the referee training experience of the China Roller Sports Association and the practice of VAR technology application, a hierarchical and classified basic VAR technology training system is constructed to ensure the pertinence and effectiveness of training. On the one hand, carry out VAR technology application training and provide special training guidance for referees of different levels. For junior referees, the main focus is to master the basic functional applications of VAR, such as playback, screenshot, and wonderful action analysis, so as to better use VAR to make correct judgments, which makes up for the lack of human eye observation ability; for senior referees, master more in-depth operating functions of VAR technology, such as comparing pictures from different perspectives, replaying tracking tracks and compiling cases, so as to enhance the dependence on VAR when making complex judgment decisions ^[5]. On the other hand, carry out training on the integration of VAR technology and judgment rules, organically combine single clauses of inline hockey competition rules with the application of VAR technology, so that referees can understand the judgment standards and procedures after VAR intervention. For common fouls such as "Fighting" and "Penalty shot", typical cases will be re-analyzed with VAR technology to explain the focus of referees' attention in different situations, and teach referees to identify and confirm fouls accurately; at the same time, explain the links involving VAR-assisted decision-making such as VAR intervention pause, substitute players, and free kick judgment in accordance with the latest revised competition rules to ensure that referees use VAR

technology correctly and orderly, and improve the accuracy and consistency of their judgments^[6].

4.2. Scene simulation: Building a VAR technology simulation refereeing platform to strengthen practical judging ability

Relying on VAR technology, build a simulation refereeing platform to restore various scenarios in inline hockey events, allowing referees to conduct refereeing training in simulated scenarios, strengthen practical judging ability, and realize a closed loop of “theoretical learning - simulated practice - ability improvement”^[7]. Firstly, create a variety of virtual referee scenario libraries, and collect different types of cases combined with the characteristics of roller skating competitions, including conventional and unconventional cases, such as conventional actions (skating, passing, shooting, etc.) and unconventional actions (different ages, groups and genders) Single foul actions, complex foul actions and scenarios of players and goalkeepers, other foul scenarios, equipment failures, etc. digitally restore the above situations with VAR technology to form a set of game environment databases of different difficulties and types. The construction of the game environment database should focus on practicality and pertinence, timely update the latest event examples and the latest rule changes of inline hockey to ensure that the built game environment can accurately correspond to the actual arena, and learn from the VAR technology application mode of sprint racing to add time stamp marks, dual-frame pictures and other factors to enhance the authenticity and professionalism of the simulated scene^[8]. Secondly, carry out immersive case training activities on the virtual judgment platform, allowing trainees to participate as referees (referee on the rink and other character of the referee team), use VAR to judge whether there is a foul, what kind of foul, and what penalty to impose in the virtual scenario, and record their refereeing process and results; at the same time, special personnel are assigned to conduct training and assessment. For their judgment loopholes, VAR technology can be used to replay videos to find out the causes of errors and help them correct mistakes, making their judgments more accurate; meanwhile, it introduces a group confrontation training mode, compares different referees as referees of the same case, promotes consensus by comparing differences in judgment standards, and enhances consistency^[9]. Thirdly, conduct event review and drills, take controversial problems in actual games as cases, use VAR technology to replay these situations from all angles, so that referees have the opportunity to deal with these problems again and compare the differences between their judgment decisions and the original ones, and discuss the reasonable and insufficient points, so as to enrich refereeing experience and improve the ability to deal with difficult problems^[10].

4.3. Precise improvement: Establishing a VAR technology-enabled precise assessment mechanism to realize personalized cultivation

Based on VAR technology, establish a precise assessment mechanism to conduct an all-round and multi-dimensional assessment of referees' refereeing performance, accurately locate the weak links of referees, formulate personalized training programs, and realize the precise improvement of referees' judging ability^[11]. Firstly, establish a diversified evaluation scoring system to evaluate their game refereeing ability. According to the characteristics of inline hockey competitions, evaluate from the aspects of judgment accuracy, familiarity with competition rules, emergency handling ability, ability to use VAR technology and control of the whole competition; each item has clear standards for reference, such as comparing the referee's judgment results with the actual situation to calculate the referee's judgment accuracy; or understanding the referee's understanding and application of rules through theoretical examinations and simulated refereeing; as for the level of VAR use, it can also measure the technical level and rationality of its use through simulated training or actual games^[12]. Secondly, carry out a

normalized assessment using VAR technology, obtain the number of judgments, judgment accuracy, number of VAR interventions, VAR emergency intervention events and other situations of referees through simulated and actual game judgment actions, and import these data into the big data platform for analysis and research, and form a personalized assessment report to locate the deficiencies of referees. For example, for referees with low judgment accuracy, analyze whether the cause of misjudgment is inadequate mastery of rules or blind spots caused by on-field positions, and then formulate targeted training programs; for referees unfamiliar with VAR technology, strengthen their VAR technology training to improve their ability in this regard^[13]. Thirdly, formulate personalized training programs. According to the evaluation results, formulate personalized education and training programs for different types of referees, and clarify the training objectives, content and progress arrangements; for example, a referee who does not accurately master the competition rules should strengthen rule learning and case analysis, and use VAR technology to observe typical examples; for referees with weak rule awareness, strengthen rule education; for referees with low emergency ability, strengthen scenario drills to reproduce emergency scenarios and improve on-site handling skills.

4.4. Long-term guarantee: Improving the supporting system for VAR technology application to promote the normalization of cultivation work

Under the background of digital transformation, the application of VAR technology in the cultivation of referees' judging ability in inline hockey needs a complete supporting system as a guarantee to promote the normalization and standardization of cultivation work and ensure the sustainability of cultivation effects. Combined with the actual development of inline hockey, improve the supporting system for VAR technology application from three aspects: system, technology and talent, and provide strong support for the cultivation of referees' judging ability. At the institutional level, a series of management systems, such as methods, objectives, subjects, standards, and assessment mechanisms for the application of VAR technology in referee training, should be formulated and formed into regulatory requirements to provide a basis. For example, formulate training and assessment methods for referees to use VAR. Incorporate the application level of this technology into their grade evaluation and promotion system, and suspend the qualification of referees who fail to meet the standards to participate in high-level games (such as National Championships, National Games, National Youth Games, Asian Championships and other international games) until they complete their studies and pass the assessment; at the same time, formulate a data management system for referees' performance to collect effectively, sort out and process referees' resumes, so as to provide corresponding guarantee for training programs^[14]. In addition, formulate an incentive mechanism to encourage referees to actively learn VAR technology, and give certain commendations and rewards to referees who use this technology well in games and have high judgment accuracy to improve their enthusiasm and initiative. At the same time, the operational ability of VAR technology can be included in the detailed rules for referees' promotion and demotion, so that training activities can be carried out on a regular basis. In terms of technical support, investment should be increased in the configuration, improvement and update of VAR technology, and supporting infrastructure for training and cultivation should be provided. For example, equip the training base of the Referees' Committee with a complete VAR equipment system, high-definition cameras, monitors, data analyzers, etc., and form standard simulated execution scenarios; in addition, it is necessary to continue to strengthen the innovative research and development and improvement of VAR technology, optimize the role of VAR based on the unique sports characteristics of inline hockey, and improve its accuracy and practical efficiency, such as setting a special identification program module for the unique sports actions of inline

hockey to facilitate referees to identify fouls quickly^[15].

5. Conclusion

In summary, digital transformation brings new opportunities for the cultivation of referees' judging ability in inline hockey, and VAR technology provides a new path for cultivation work. In the process of ability cultivation, the systematic and accurate improvement of referees' judging ability should be realized through the four-dimensional cultivation model of "technology empowerment - scene simulation - precise improvement - long-term guarantee". With the upgrading of technology, we should increase the application of digital technology, improve the supporting system, promote the promotion of the cultivation model, build a professional and efficient referee team, provide a guarantee for the high-quality development of inline hockey, help build a strong sports country, and provide reference for the cultivation of referees in other emerging sports.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Ouyang W, 2024, Research on Strategies to Improve the Judging Ability of Basketball Referees Among College Sports Majors in Hunan Province, thesis, Hunan University of Science and Technology.
- [2] Xu Q, Pan J, Liu X, 2025, Construction of a Cultivation System for the On-court Judging Ability of Basketball Referees Among College Sports Majors. Academic Achievements Collection of the 14th National Sport Science Congress — Written Communication (Sport Training Branch), 2025: 46–47.
- [3] Sun H, 2025, Research on the Current Situation and Improvement Path of the Judging Ability of Sports Education Majors in Nanjing Normal University, thesis, Nanjing Sport Institute.
- [4] Yang C, 2025, Research on the Cultivation Path of Track and Field Referees' Judging Ability in Harbin Colleges and Universities, thesis, China University of Mining and Technology.
- [5] Cui X, 2025, Research on the Construction of a Comprehensive Ability Evaluation Index System for First-Class Swimming Referees, thesis, Guangxi Normal University.
- [6] Chen F, 2025, Research on the Construction and Application of a Judging Ability Evaluation System for Wushu Routine Referees, thesis, Hebei Normal University.
- [7] Zhang X, 2025, Research on the Management Mechanism and Cultivation Path of Track and Field Referees in Shandong Province, thesis, Inner Mongolia Normal University.
- [8] Liu Y, 2025, Research on the Construction of a Judging Ability Evaluation Index System for First-Class Volleyball Referees, thesis, Wuhan Sport University.
- [9] Xie Z, 2025, Research on the Construction of a Judging Ability Index System for Badminton Referees, thesis, Shanghai University of Sport.
- [10] Huang H, 2024, Research on the Current Situation and Optimization Strategy of the Cultivation of Competitive Taekwondo Referees in Guangxi, thesis, Guangxi University for Nationalities.
- [11] Su B, 2024, Research on Improving the On-court Judging Ability of Ningxia Basketball Referees Based on

Reciprocal Determinism Theory, thesis, Ningxia University.

- [12] Chen Y, 2024, Investigation and Research on the Judging Ability of Wushu Routine Referees in Henan Province, thesis, Henan University.
- [13] Zhao Y, Cui Y, 2024, Research on the Judging Ability and Cultivation Strategy of Basketball Referees in Kunming University of Science and Technology. *Sports World*, (05): 121–123.
- [14] Yu J, 2024, Research on the Construction of a Judging Ability Evaluation System for College Basketball Referees in Jilin Province, thesis, Changchun Normal University.
- [15] Zhou G, 2024, Research on the Cultivation Strategy of Judging Ability of Basketball Specialized Referees in Sports Departments of Henan Province, thesis, Harbin Sport University.

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