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Virtual Reality (VR) in Sports Coaching, Skill Acquisition and Application to Surfing with Special Reference to India: A Review

- 1) **Dr. Dilipkumar Bhagoji Gholap**, Assistant Professor- Physical Education department, Rajju Shroff ROFEL University (RSRU), Vapi, Gujarat
 - 2) **Dr. Tanvi Vitthaladas Tarpara**, Assistant Director- Physical Education & Sports Dept., Vanita Vishram Women's University, Surat, Gujarat
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Abstract: *With its immersive training and performance-enhancing surroundings, virtual reality (VR) has become a game-changing tool in sports coaching and skill development. With an emphasis on India, this analysis looks at how VR is used in sports teaching, how it affects skill development, and how it is used to surfing. The assessment examines VR's technological developments, the advantages it offers for sports training, and the obstacles and possibilities facing its uptake in India. The paper also elaborates different funding agencies.*

Key Words: *Virtual reality, Coaching, Athlete development, Skill acquisition, Technology, funding agencies*

1. Introduction

Virtual reality (VR) technology has transformed a number of industries, including skill development and sports coaching. Virtual reality (VR) offers coaches and players cutting-edge capabilities to replicate real-world situations, evaluate performance, and improve training results. In the context of surfing, virtual reality (VR) presents a special chance to hone skills, comprehend wave dynamics, and enhance decision-making abilities without actually being in the water. In a nation like India, where access to high-quality surf training facilities is scarce, this is especially advantageous.

2. Virtual Reality in Sports Coaching and Skill Acquisition

2.1 Technological Advancements in VR

Training settings that are extremely realistic and engaging have been made possible by recent advancements in virtual reality technology. The realism of VR simulations has increased thanks to developments in 3D modelling, motion tracking, and haptic feedback technologies, which makes them useful resources for sports teaching.

2.2 Benefits of VR in Skill Acquisition

Athletes can practice repeatedly without being limited by time or location thanks to virtual reality training. It promotes the growth of cognitive capacities, motor skills, and tactical awareness. According to studies, virtual reality (VR) can enhance decision-making, reaction times, and performance consistency across a range of sports.

3. Application of VR to Surfing

3.1 Simulating Surfing Environments

VR platforms allow surfers to practice maneuvers and tactics in a controlled environment by simulating a variety of wave situations. Programs such as "Surf World Series VR" and "Rip wave Surfing" provide surfers with lifelike ocean wave simulators to assist them hone their skills.

3.2 Enhancing Technique and Decision-Making

VR training aids surfers in developing their timing, balance, and wave-reading skills by offering real-time feedback and visual cues. During actual surfing sessions, this results in improved decision-making and more effective use of wave energy.

4. VR Surf Coaching Initiatives in India

4.1 Salt Life Academy

Shamant Kumar established Salt Life Academy with the goal of professionalizing coaching for water sports in India. The academy prioritizes skill development and safety while providing globally recognized credentials. Although their coaching programs are mostly centred on in-water training, the incorporation of virtual reality could improve them even more.

4.2 The Shaka Surf Club

The Shaka Surf Club is a surfing culture and education organization that was co-founded by Ishita Malaviya, the first professional female surfer in India. Virtual reality tools could enhance the club's community-based teaching strategy by complementing conventional coaching techniques.

5. Challenges and Opportunities in India

5.1 Challenges

- **Infrastructure and Accessibility:** The broad use of VR in sports coaching may be hampered by rural areas' limited access to high-speed internet and cutting-edge VR equipment.
- **Cost:** Many surf schools and individual trainers could find the high initial cost of VR systems prohibitive.
- **Technical Expertise:** For VR systems to be implemented successfully, trained staff are required to operate and maintain them.

5.2 Opportunities

- **Skill Development:** VR can serve VR can be used as an additional tool to help people improve their skills, particularly those who are new to the sport or live inland and cannot reach the sea.
- **Remote Coaching:** Virtual reality (VR) makes it possible to conduct coaching sessions remotely, giving a wider audience access to professional advice.
- **Community Engagement:** Virtual reality (VR) can be utilised to establish online communities for surfers, encouraging a feeling of community and mutual education.
- **6. Availability of Funding agencies:**

6.1 Technology Development Board (TDB)

The TDB, which was founded by the Indian government, encourages the advancement and marketing of domestic innovations. It offers financial support to research and development organisations as well as equity capital or loans to industrial businesses. Numerous technology-driven initiatives, particularly those in the sports industry, have received board backing.

6.2 Startup India Initiative

Startup India was established by the Indian government with the goal of encouraging entrepreneurship and innovation. Tax breaks, subsidies, and venture capital funding through the Fund of Funds for Startups (FFS) are just a few advantages it provides. These advantages might be available to startups developing virtual reality sports coaching software.

6.3 Meta's Mixed Reality Fund

A \$250,000 fund has been established by Meta to assist Indian businesses creating mixed reality (MR) apps. The goal of this project is to hasten the development and uptake of VR and MR experiences in India. Financial incentives, expert mentoring from Meta Reality Labs, and networking opportunities with Indian venture capital funds will be provided to selected startups.

6.4 Consortium for VR/AR/MR Engineering Mission in India (CAVE)

CAVE is an alliance of government agencies, businesses, startups, and academic institutions that is coordinated by the Indian Institute of Technology Madras (IIT-M). Its goal is to empower members to develop new cutting-edge applications and technology in haptics, mixed reality (MR), augmented reality (AR), and virtual reality (VR). The consortium promotes cooperation and advancement in various fields of study.

6.5 Software Technology Parks of India (STPI)

Centres of Excellence (CoEs) have been developed by STPI in a number of fields, including Imphal's Emerging Technologies-AR/VR CoE. By offering resources and infrastructure to promote innovation, these institutes assist startups and businesses working on cutting-edge technologies.

6.6 Crowdfunding Platforms

Crowdfunding platforms provide an alternate source of investment for early-stage businesses. Startups can generate money by showcasing their concepts to a worldwide audience on websites like Kickstarter and Indiegogo. This strategy confirms consumer interest in the suggested VR sports coaching applications in addition to providing funds.

7. Conclusion

Sports coaching and skill development could be greatly improved by virtual reality, especially in specialized sports like surfing. Because VR offers immersive and interactive learning experiences, it can help close the gap in India, where access to high-quality surf training resources is limited. However, resolving issues with infrastructure, cost, and technological know-how is essential for its successful integration. VR has the potential to significantly contribute to surfing's growth as a popular activity in India with the correct funding and assistance.

India provides a favourable setting for the creation of VR-based surfing and other sports coaching apps. Startups and innovators can raise money for their projects via utilising government programs, university partnerships, and private sector assistance. Participating in these initiatives can help VR technology expand and be used in sports training and skill development.

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