Anticipating Student Engagement in Classroom through IoT-Enabled Intelligent Teaching Model Enhanced by Machine Learning

Raaid Alubady[1,*], Tamarah Alaa Diame[2], Hawraa Sabah[3], Hasan H. Jameel Mahdi[4], Munqith Saleem[5], Korhan Cengiz[6], Sahar Yassine[7]

[1]Technical Engineering College, Al-Ayen University, Thi-Qar, Iraq
[2]Technical Computer Engineering Department, Al-Kunooze University College, Basrah, Iraq
[3]Department Of Medical Devices Engineering Technologies, National University Of Science And Technology, Dhi Qar, Nasiriyah, Iraq
[4]Computer Technologies Engineering, Al-Turath University College, Baghdad, Iraq
[5]Medical Instruments Engineering Techniques, Al-Farahidi University, Baghdad, Iraq;
[6]Department of Information Technologies, Faculty of Informatics and Management, University of Hradec Kralove, Kralove, 500 03, Czech Republic
[7]Department of Applied Data Science, Noroff University College, Kristiansand, Norway;
Emails: Alubadyraaid@Alayen.Edu.Iq; Tamarah.Alaa@Kunoozu.Edu.Iq; Hawraa.A.Sabah@Nust.Edu.Iq; Hasan.Harith@Turath.Edu.Iq; Munqith.Saleem@Uoalfarahidi.Edu.Iq; korhan.cengiz@uhk.cz; sahar.yassine@noroff.no
*Corresponding Author: Alubadyraaid@Alayen.Edu.Iq

Abstract

Machine learning provides several advantages for the usage of physical teaching technology. Machine learning is one of the major paths with connected technology and is part of a powerful frontier discipline that develops and influences overall education growth. To enhance student connection and assess student involvement in physical education, the Machine Learning assisted Computerized Physical Teaching Model (MLCPTM) has been developed in this work. The proposed MLCPTM intends to investigate and address contemporary technical physical education to create the ideal theoretical foundation for the growth of technology and current physical activity. Virtual reality (VR) technologies are used in the proposed MLCPTM to create a system for correcting physical education activity. The theory and category of machine learning were covered in this essay, along with a thorough analysis and examination of modern technological advancements in physical education. The challenges with machine learning in contemporary sports instructional technologies are also explained. Then, athletes should accelerate their knowledge of the movement techniques and heighten the training effect. According to the results of the experiments, the suggested MLCPTM model outperforms other existing models in terms of an effective learning ratio of 82.5 per cent, feedback ratio of 96 per cent, response ratio of 98.6 per cent, decision-making ratio of 96.3 per cent, and movement detection ratio of 79.84 per cent, the precision ratio of 97.8 per cent.

Keywords: Correction System; Machine Learning; Physical Education Classroom; Physical Activity; Student Involvement.

1. Introduction

Physical education teaching is an essential part of the school and college education system that is narrowly related to the future advancement of national education and national health [1]. Physical education is much more than just playing games since teachers must help kids understand core ideas and create an engaging learning environment [2]. Physical education can be defined as engaging in the reflective process, being professional, evaluating and providing constructive criticism, meeting the needs of a diverse student body, equipping learners to maintain and achieve a healthy lifestyle, having the skills, knowledge, and values to improve teaching practices, and establishing high expectations for learning the psychomotor, affective, and cognitive field. [3]. The demand for content and physical education among college students is steadily rising as society advances [4]. In order to impart higher education's expanding reform progression, the current physical education coaching in universities

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and colleges cannot currently meet the needs [5]. Thus, it is significant to discover the physical education training approaches in proportion to universities and colleges' teaching practices and enhance teaching [6]. Consequently, the school must adopt new science and technology sports actively reform. The innovative teaching mode can resolve challenging teaching complications, and VR technology has become crucial [7].

With the reform of physical education and teaching curricula in universities and colleges, computerized VR technology has been implemented to disrupt the chains of the conventional inflexible curriculum models and transform the training model from the 2D world to the 3D computer-generated Globe [8-9]. The traditional physical education technique is primarily based on experience and subjectivity [10-12]. The coach's actual training sessions directly impact the athletes' learning development. Thus, the action space of traditional physical education training is greatly expanded by starting with the technical visualization environments of virtual reality (VR) or augmented reality (AR). [13].

Machine learning with VR technology is utilized to pretend real-world actions with interactive tools [14]. The user is closed to the natural way to communicate with the virtual environment among the contestants and the virtual environment to create an interactive association among the real-time production [15]. It is comparable to the natural environment in the sensor experience [16]. As a modern physical education technology, VR technology can shorten the training period and attain intuitive influence [17]. It can raise students' self-training perception and creative capability in teaching reforms [18]. It facilitates learners to become faster, more intuitive, and more stable [19]. Learning sports skills and knowledge will become the modern trend of developing physical education reform methods [20].

To enhance student engagement and examine students' participation in physical education, the MLCPTM model has been suggested in this study. Incorporating VR technology into physical education and training in schools or colleges can make students feel immersed, and studying and practicing in specific scenarios can greatly improve the educational impact. From the viewpoint of physical education, the functional activity test based on artificial intelligence (AI) conforms to the physical fitness test's essential meaning and enhances college students' physical exercise awareness. The intelligent remote multimedia-assisted physical education system based on AI frees the physical education process from time, flexibility, and place limitations and can adopt various teaching policies according to students' conditions to establish personalized teaching.

The remainder of the essay is organized as follows: The overview and current physical education model in the classroom are covered in sections 1 and 2. The MLCPTM model is proposed in section 3. The experimental results are achieved in section 4. Section 5 brings the research paper to a close.

2. Related Works

Juho Polet et al. [21] suggested the randomized controlled trial protocol (RCTP) for promoting out-of-school physical action in lower secondary school students. The test model used a waitlist control design with randomization of the cluster per school. Physical education or sports teachers appointed to operational status were provided with a two-week, 12-hour training schedule to get detailed knowledge about how physical fitness was promoted outside classrooms and philosophy focused on techniques designed to encourage students' self-support physical activity. Teachers assigned to the waitlist situation underwent an additional physical skill monitoring course for special needs children. PE teachers from eleven different schools (n = 29) used the intervention software for one month in PE classrooms.

Teaching Personal and Responsibility with Sport Education and the Conventional Teaching Model was proposed by Yi-Hsiang Pan et al. [22]. (TPSR-SE-TTM). For statistical analysis, multivariate analysis of covariance was used. The results of the study showed that the TPSR-SEM experimental groups could improve learning capacities in the dependent parameters, including sports enthusiasm, responsibility, sports performance, and self-efficacy, more than the TPSR-TTM control groups. They came to the conclusion that in the psychomotor, cognitive, and emotional areas for physical education progressions, the TPSR-SEM group may boost learning qualities more than the TPSR-TTM groups.

To investigate the effects of physical education teachers' controlling behaviour on their students' health-related quality of life, Tilga et al. [23] created the conditional process model (CPM). Schoolchildren (N=1042) self-reported on their perceptions of controlling behaviour, support for teacher autonomy, annoyance with needs, and health-related quality of life. As expected, the effect of the instructor's reported controlling behaviour on HRQoL was determined by need frustration. The perceived autonomy provision did not mitigate this indirect effect. More particular, increased autonomy support did not lessen the requirement for the indirect influence of perceived controlling behaviour on HRQoL, which is based on dissatisfaction.

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In order to examine the effects of middle school students' perceptions of autonomy provision from their physical education coaches on autonomous motivation towards physical education, Juho Polet et al. [24] initially developed the trans-contextual model (TCM). And in the direction of critical and sincere participation in PA during free time in schools. The trans-contextual model's effectiveness in predicting change in middle school students' autonomous motivation across physical education and leisure-period contexts, accounting for the variation in intentions toward and actual involvement in leisure-time physical activity, was demonstrated by the results, which furthered the study on this model [25-26].

In this paper, MLCPTM has been suggested to overcome the challenges in existing models. Therefore, machine learning models that utilize the features extracted from high-frequency raw accelerometer information may be essential to attain the time resolution necessary to portray free-living students' irregular activity patterns. The following section discusses the proposed MLCPTM model briefly.

3. Machine Learning assisted Computerized Physical Teaching Model (MLCPTM)

This paper discussed the machine learning-based computerized physical teaching model for improving student physical activity. Digital reality technologies are evolving quickly with the continued growth of culture and the accelerated development of science and technology. It has been commonly used to show an irreplaceable presence in all walks of life. The integration of modern education with science has begun. The use of information technology is steadily expanding in sports. Compared to traditional physical education (PE), computerized virtual digital education systems are simple and dependable since they can quickly fix the flaws in conventional paths and rectify physical education motions in real time. As a result, the athletes can pick up new strategies or movement patterns to improve their training results. Therefore, MLCPTM has been suggested in this study to enhance learning outcomes based on virtual reality. Movement estimation training, real-time movement data analysis, and student motion pose recognition in three-dimensional animation can be used to achieve real-time physical education. A scientific foundation must underpin PE teachers' evaluation and preparation methods. This article uses an augmented reality-based motion correction technique for physical education.

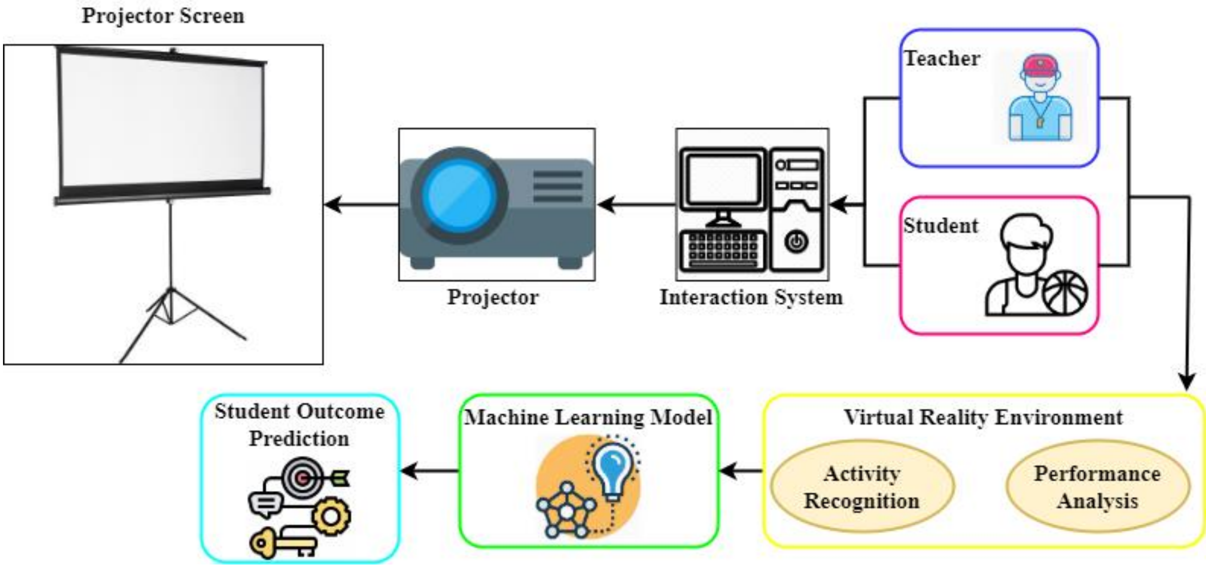

Figure 1: Virtual Reality-Based Physical Education

Figure 1 shows virtual reality-based physical education. The immersive machine system monitors the action properties in real-time and helps the trainer evaluate the athlete's physical activity's normal amount in time. The virtual reality scene analysis model analyses the movement condition in three-dimensional viewing and allows physical education training in real time. The VR technology records PE training movement and collects similar physical education and index variables. The projector projects the VR videos and outputs on the screen. A virtual reality environment must be built, and sports gestures must interact three-dimensionally in real time. First, it should be possible to resolve the motion catch system's coordination system transition and the movement association among different parts of the human body. The human body is generalized to a multi-rigid structure, and its movement is a multi-body solution mechanism for dynamics and film. The human body's statistical model and the 3-D geometry converge to construct a human cinematic behaviour model of physical features, implemented in the PE virtual reality framework and the application programming interface (API) to enhance the PE virtual reality system's realism.

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The virtual display application platform includes a three-dimensional virtual reality demonstration environment and a three-dimensional interactive, real-time database for the design and installation of the PE motion-correcting device. This paper contains a two-channel stereo display device, which receives the user's interactive information and the measurement results on workstation computer one and workstation computer, graphic calculation, and drawing. Thus, the images are transported using four projectors. Each projector is grouped into double-channel stereoscopic display systems, achieving a 3-D effect via polaroid. The two workstation computers transmit data through the network to the projectile through the edge fusion calculation and the image correction. A web and a serial cable link machines and computers to each other to ensure synchronized checks and views. The rear configuration diagram appears in Figure 1.

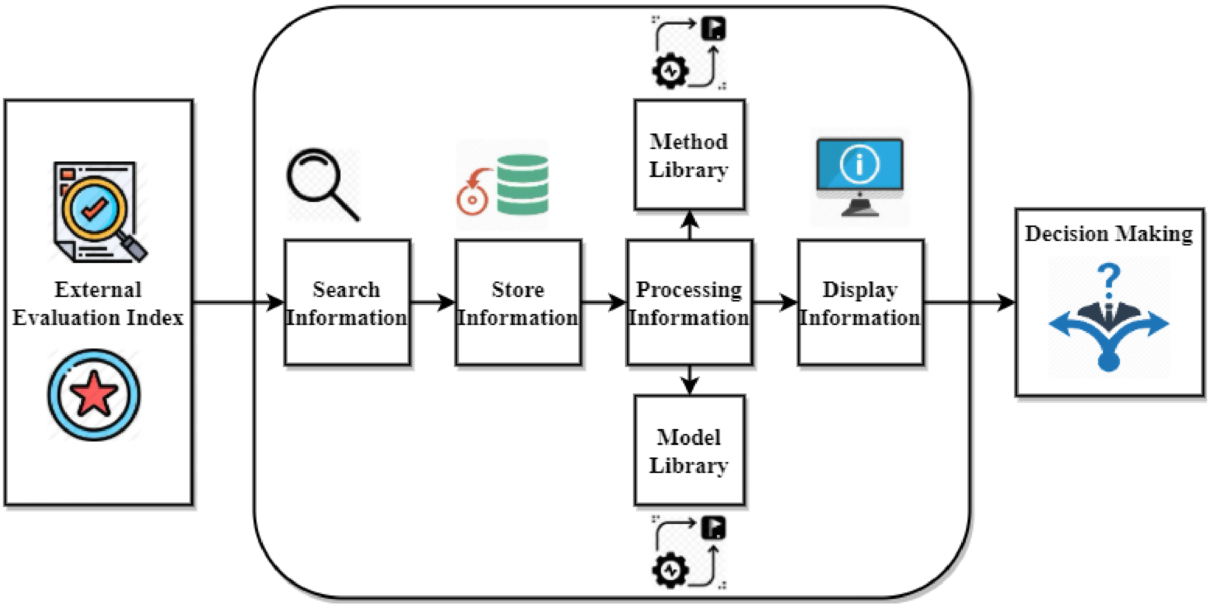

Figure 2: Virtual Learning-Based Teaching Evaluation Model

Figure 2 demonstrates the virtual learning-based teaching evaluation model. Create and shoot virtual sports dancing videos such as a curriculum, essential and difficult teaching points, the stage setting, and the shooting angle. This model first determines each lesson's technical activities according to the teaching schedule, points out specific relevant and difficult points, then picks the right moment and position takes a real-view video or panoramic shot, and then displays the dramatic video or the screen picture on the monitor. They used advanced early-stage education computer tools to conduct video editing, panoramic stitching, and postprocessing according to the teaching schedule. Synthesize the dramatic video developed mid-term, logical bug checking, constant content improvement, repetition, and video production.

Display VR video content through the VR viewer, repeatedly view and test content. The team must change the weaknesses, and the release must finally be completed. This paper's principal research material examines, using virtual reality technologies, the modern form of physical education if the educational effect differs clearly from conventional teaching methods. The experiment must first be tested to avoid the influence of other variables on the investigation. To improve the experimental findings' accuracy and conviction, the students who participated in the experiment conducted a basic physical examination, and a test of the measured data was undertaken.

A questionnaire data was collected on the sample's interest in physical education before the lecture and the student interest's statistical findings before the experiment to reduce outside influences on the investigation. Figure 2 shows that most students are involved in PE lessons since tennis. People like tennis very much, representing the total number of topics. In the experiment, students expressed great interest in sports and became excited about physical education. Use the neural network mostly to obtain an educational impact. To accurately evaluate the evaluation results, the evaluator is guided by the evaluation results module to record and review results and include corresponding machine self-learning samples and simulation models. The system is the knowledge base management team's responsibility to gain useful knowledge and maintain and manage necessary knowledge during system development. The mechanism for model methods management is responsible for the functioning, maintenance, and administration of systems models and processes and the calling and connecting of models and methods according to expertise. Different models, including neural network-based self-learning models, are stored in the model library with the neural network assessment scheduling model. Figure 2 shows the basic teaching

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assessment module phase. A model library is a series of model components that cannot be modified and bundled in one device to implement the project. Search engines are an important part of student study. Students use search engines to address everyday data requirements, resolve problems, increase knowledge, clarify things, reduce doubts, entertain, satisfy other curiosities, etc. The show of learning aids and tools allows students to learn freely and get the knowledge they need anytime they want with easy access to this resource. The philosophy of information processing is founded on the premise that man actively processes information from his senses, much like a machine.

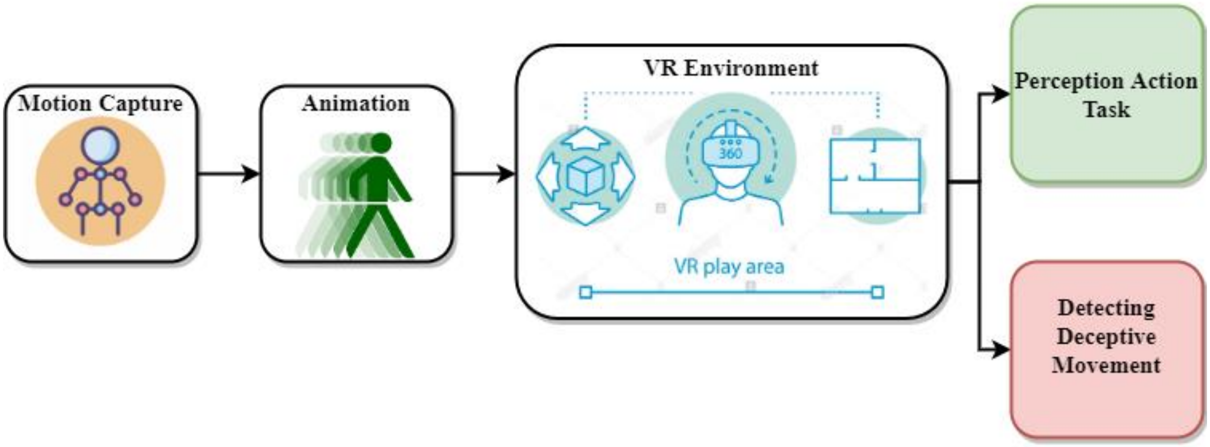

Figure 3: Student Performance Analysis in Physical Education.

Figure 3 elaborates on the student performance analysis in physical education—the first challenge to assessing a student's ability to perceive only disappointment in a vision. The second has been to study students' responses (effects) to various sports pathways in the perception-action process (perception). These case studies highlight the benefits of using VR to explain the thought loop and, hence, sports success. A three-part method includes using VR technologies to study sports per person (see Figure 3). The first move is to capture the conduct of athletes in a particular sport. These behaviours are useful for the animation of virtual characters and for comparing the subjects' gestures in actual and immersed contexts. The second phase entails animating the virtual humanoids and adjusting them to specific constraints. The presentation of the virtual environment is a part of the third stage. The first two phases apply to all apps, while the third step depends on the specific application because each immersive display device has advantages. On the other hand, the sport's interpretation role aims to identify the unsatisfactory actions of its fictitious adversary.

Virtual Reality (VR) has become a new word for state-of-the-art computer-based interface technologies. It aims at building engagement, immersion, and creativity between networks. Today, success has been accomplished enough that people can get a completely immersive experience. The innovative advancement of educational technologies is seen as virtual education in sports. It provides a different learning atmosphere, changes the conventional approaches, and encourages modern learning forms. Interaction allows students to change the learning process. Most of the virtual sports equipment scenes are virtual, and the educational contents can be regularly changed to match the current equipment education requirements to keep track of the times. In a highly secure environment, it will develop student skills. Students will practice again and again before they succeed in the interactive learning environment. In this paper, virtual reality technology is applied based on semi-controlled student identification and prevention training to represent sports' true success. The machine learning algorithm first develops the implementation approach. Virtual reality technologies will be employed to identify unmarked student-athletes. The classifier committee measures the closest neighbours' confidence to provide unmarked sports trainees with strong trust in the sports training. The method will boost the overall development of the whole model. Finally, augmented reality technology is combined to allow decision-making after a series of screening and extrapolation. The Physical Education Process is shown below.

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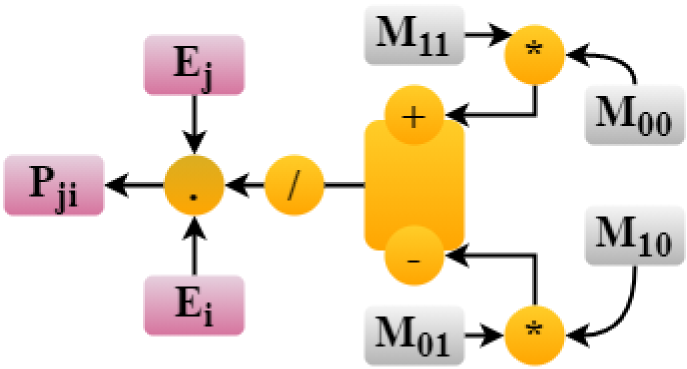

Figure 4: Physical Education Process

The difference in technology for virtual reality is described as the propensity to misrepresent athletes' facts in various classifications. For, e.g., E_j and E_i reflect two different technologies in virtual reality, where i, j are the reference indices. This paper uses P figures to assess the difference between technologies in virtual reality, as seen in Figure 4. The $P_{ji}(E_j, E_i)$ defines the assessment function with technologies to be evaluated, such as E_j and E_i. The virtual learning-based physical teaching assessment method is as follows in equation (1):

$$P_{ji}(E_j, E_i) = \frac{M_{11}M_{00} - M_{01}M_{10}}{M_{11}M_{00} + M_{01}M_{10}} \tag{1}$$

As calculated in equation (1) and figure 4, virtual reality technologies-based physical education processes have been derived. The formulation refers to the number of students that can be properly classified with $E_j$and E_i, M_{10} refers to the right grades, M_{01} to the right grade of E_j, and the wrong grade E_j and M_{00} to E_i and $E_j . E_i$. M_{10}refers to the right grade E_j. The ML algorithm balances the number of individuals whose sorting is incorrect.

The closest neighbours' trusting formula is assessed for engaging students in PE augmented reality technologies. The AK_N Members' classification collection with N classification outputs can result from the classifier G_N , as seen in equation (2):

$$G_N = \{AK_1, AK_2, \dots, AK_{N-1} | AK_N \in G\} \tag{2}$$

As found in equation (2), the member classifier has been deliberated. G_N is a classifier rather than the AK_N in the formula. If non-sporting competitors are to be classified, the following basic requirements should be fulfilled. The data comes from different universities; If students from the same university come from physical education, they can be the same according to the division. Based on the above two hypotheses, the MLCPTM should understand the confidence level of unmarked athletes. If there are two Y_N and Y_M Students in physical education, where N and M are the student index, the following formula can be used to indicate the cosine similarity in equation (3):

$$T(Y_N, Y_M) = \frac{Y_N . Y_N}{\|Y_N\| \|Y_M\|} \tag{3}$$

As computed in equation (3), cosine similarity has been described. T is known as similarity; a part of the unlabeled athletes can be highlighted in the G_N Classification, adding to the training data set. To express the accuracy of Y_j^V And its L labeled neighbours, the following formulation can be used for a certain kind of confidence level at present in equation (4):

$$confidence(Y_j^V) = \sum_{p=1}^{N-1} \sum_i^L T(Y_j^V, Y_j^p) \times consistency\ (AK_p(Y_j^V), XY_j^p)$$

$$consistency(AK_p(Y_j^V), XY_j^p) = \begin{cases} -1, AK_N(Y_j^V) = XY_j^p \\ 1, AK_N(Y_j^V) = XY_j^p \end{cases} \tag{4}$$

As shown in equation (4), neighbour confidence $confidence(Y_j^V)$ and consistency $consistency(AK_p(Y_j^V), XY_j^p)$ Have been discussed. It can consider vote V according to the member classifier set

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G_N to get Y_j^V Label. The identifier p is the looping variable. The variable XY_j^p is the expected output for the given input Y at p.

$$\hat{X}_V = argmax G_N(Y_V) \tag{5}$$

Equation (5) denotes the expected vote for the input at the classifier G_N. An augmented reality environment must be constructed, and three-dimensional dynamic interaction with sports gestures must be made in real time. First, the transition of the motion capture mechanism by the coordinating system and the association of movements between the different portions of the human body must be resolved. When the person becomes a multi-stiff structure, the motion shape is a mechanism of multi-body mechanics and cinematic solutions.

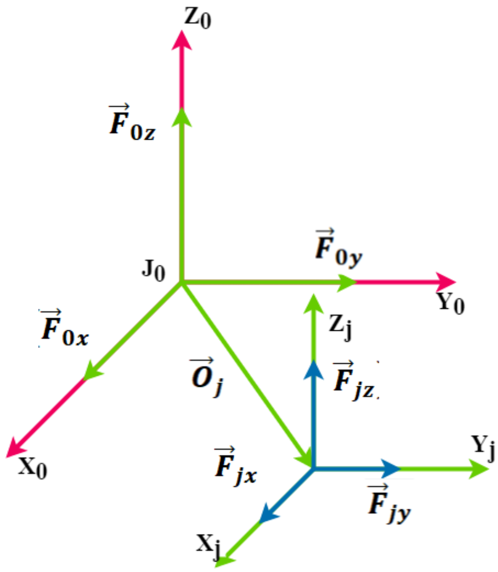

Figure 5:Body Movement and Angle Representation

Figure 5 shows the body movement and angle representation. A Lagrange analytical mechanical equation is primarily used to solve the multi-body dynamics. First, the rectangular cartesian coordinate is utilized to construct the geodetical coordinate systems, and the unit vector is denoted as $\vec{F}_0 = (\vec{F}_{0x} \quad \vec{F}_{0y} \quad \vec{F}_{0z})$. Every tissue is then condensed into a rigid local coordination structure T_iAnd its unit vector is defined for the shortened human manifold rigid bodies. The unit vector $\vec{F}_j = (\vec{F}_{jx} \quad \vec{F}_{jy} \quad \vec{F}_{jz})$ the limited coordinate systems of the stiff body are finally connected to the coordinate systems of the rigid body. As seen below, the origin, displacement, and rotational matrix are determined by the unit vector of the reference coordinates system. $D_{0j}(3 \times 3)$ of the stiff body T_iCentral positions are established. To increase the realism of the PE virtual reality framework, the statistical model of the human body and its 3-D geometry are combined to create a human cinematic model with physical features.

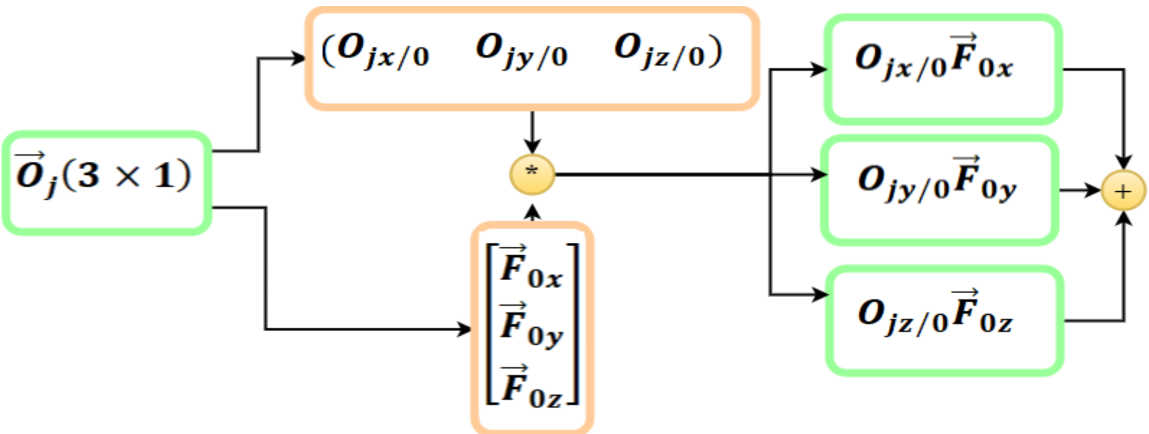

Figure 6: Centroid Position of the Displacement Vector

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In Figure 6, a rectangular coordinate system at the rigid location of the body centre can be determined by the displacement vector $\vec{O_j}(3\times1)$, and as described in equation (6) column matrix within the geodetic coordinate system has been formed. The rotating unit matrix represents the rotary matrix $D_{0j}(3\times3)$ around the coordinate axis as described in equation (7) and the Euler/Cardan angle $\varphi = [\sigma \quad \delta \quad \beta]^T$. The centroid position of the displacement vector has been formulated in equation (6):

$$\vec{O_j}(3\times1) = (O_{jx/0} \quad O_{jy/0} \quad O_{jz/0})\begin{bmatrix}\vec{F}_{0x}\\ \vec{F}_{0y}\\ \vec{F}_{0z}\end{bmatrix} = O_{jx/0}\vec{F}_{0x} + O_{jy/0}\vec{F}_{0y} + O_{jz/0}\vec{F}_{0z} \tag{6}$$

$$D_{0j}(3\times3) = \begin{bmatrix} cos\delta cos\beta & -cos\delta sin\beta & sin\delta \\ sin\sigma sin\delta + cos\sigma sin\beta & -sin\sigma sin\delta sin\beta + cos\sigma cos\beta & -sin\sigma cos\delta \\ -cos\sigma sin\delta cos\beta + sin\sigma sin\beta & cos\sigma sin\delta sin\beta + sin\sigma cos\beta & cos\sigma cos\delta \end{bmatrix}$$

The centroid position of the displacement vector has been calculated in Equations (6) and Figure 6. The six degrees of rigid body freedom T_i is thus generalized in space. (7) display the ϑ_j Velocity matrix, of which the velocities are central to a rigid bodyshell T_iAnd the vector velocity matrix θ_j.

$$Q_j = [O_{jx/0} \quad O_{jy/0} \quad O_{jz/0}\, \sigma_j \quad \delta_j \quad \beta_j]^T$$

$$\vartheta_j = \begin{bmatrix}\dot{O}_{jx/0}\\ \dot{O}_{jy/0}\\ \dot{O}_{jz/0}\end{bmatrix}$$

$$\theta_j = \begin{bmatrix}1 & 0 & sin\delta\\ 0 & cos\sigma & -sin\sigma cos\delta\\ 0 & sin\sigma & cos\sigma cos\delta\end{bmatrix}\begin{bmatrix}\dot{\sigma}\\ \dot{\delta}\\ \dot{\beta}\end{bmatrix} \tag{7}$$

As deliberated in equation (7), human body structure and position have been calculated. As seen in equations (6) and (7), the human body structure is composed of M rigid bodies, which have been fixed to the second kind of lagrangian equation.

$$\frac{d}{dt}\left(\frac{\partial S}{\partial Q_j}\right)^S - \left(\frac{\partial S}{\partial Q_j}\right)^S = H$$

$$T = \frac{1}{2}\sum_{j=1}^{M}\left(\vartheta_j^T N_j \vartheta_j + \theta_j^T J_j \theta_j\right) \tag{8}$$

As inferred in equation (8), the human body's kinetic energy has been formulated. The T is the kinetic energy of a M rigid body represented by force F_j and moments N_j Acts on a rigid body; H is the standardized vectors, N_j is the massing of the hard body; J_j Denotes the rigid body's inertia movement.

Compared to other popular models, the proposed MLCPTM model enhances the effective learning, precision, feedback, response, movement detection, and decision-making ratio.

4. Numerical Results and Discussion

Through observations, interviews, and document analysis, this study has attempted to discover the efficiency of virtual reality for teaching physical education from diverse aspects in terms of repeated practice and understanding of fundamentals, regulating posture and mastering the knack, mutual support, and teamwork, and promoting motivation and promoting learning. Problems encountered will be explained and discussed regarding playing, moving, and education. Based on performance criteria such as precision, movement detection, effective learning ratio, feedback rate, decision-making ratio, and student response rate, the experimental results have been carried out.

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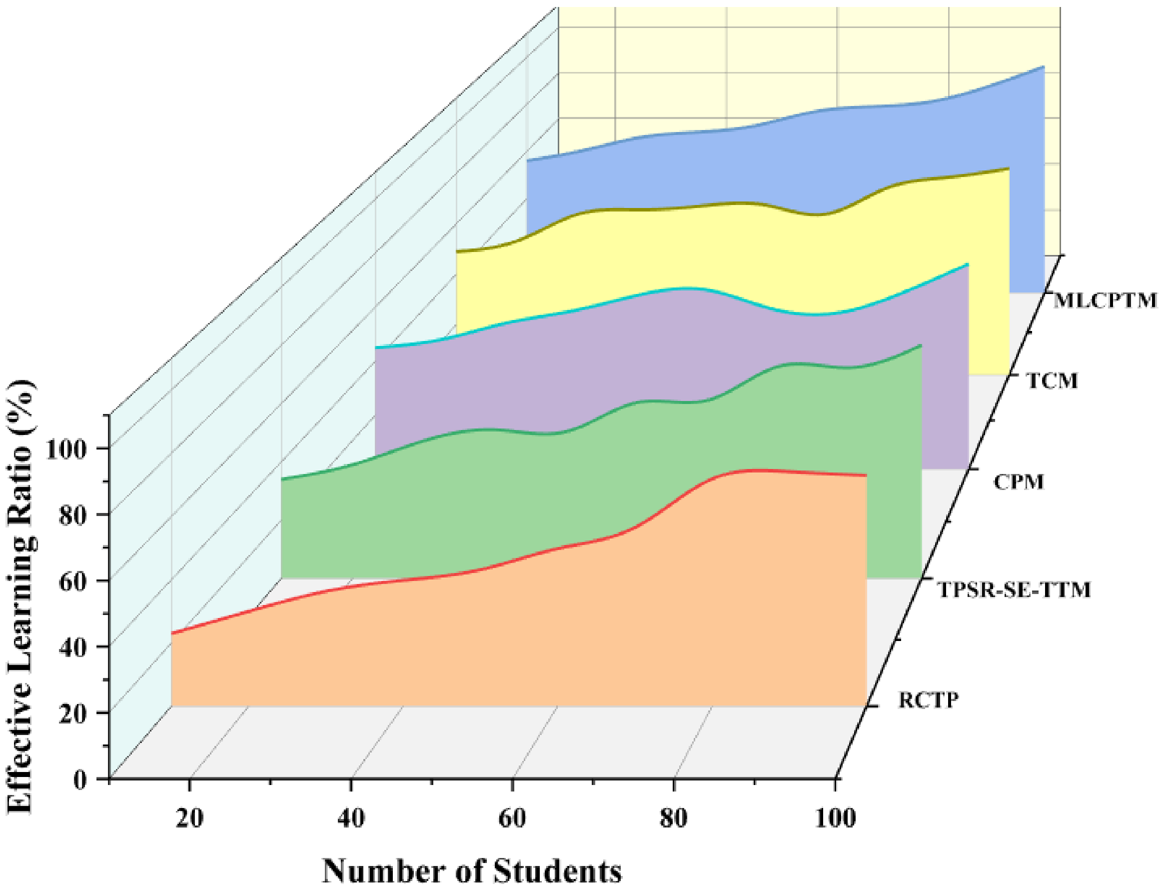

Figure 7: Effective Learning Ratio

The suggested MLCPTM model uses information technology via the integration of VR in the physical education process. Machine learning and VR-based fitness systems combined physical activities with academic lessons and tests. This integrated learning environment implemented four typical biological fitness systems with cognitive learning in five knowledge classes: flexibility, muscular resistance, cardiopulmonary, and sports injuries. The coach's actual practice experience directly impacts the sportspersons' learning progress, creating conventional physical education training that starts from augmented or VR technical conception environments. It significantly enlarges the action space of physical education training. Figure 7 it can clearly shows that the proposed model can give the highest effective learning ratio of an average percentage of 82.5% compared to existing models.

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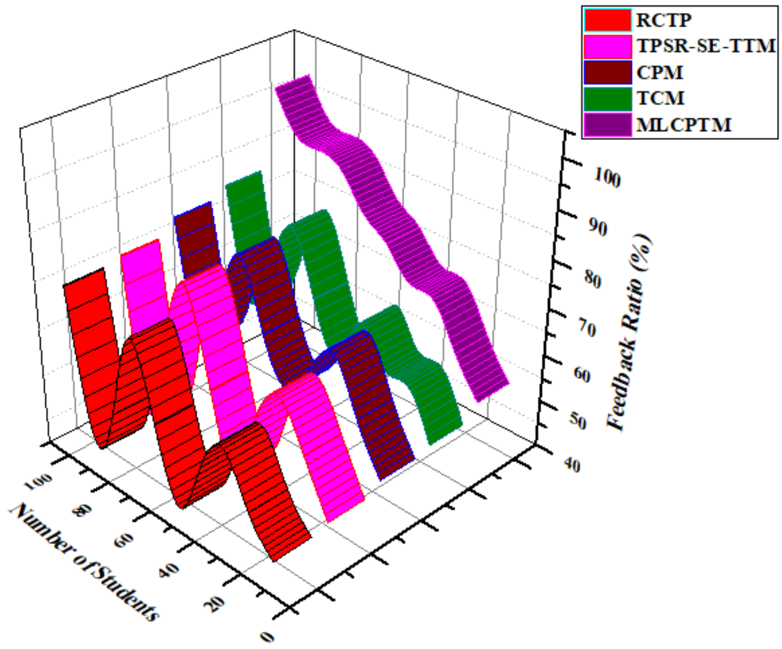

Figure 8: Feedback Ratio

In Figure 8, experiment groups 1 and control group 2 were set up. The targeted improvement training based on VR physical training has been conceded out for trial group A since both groups' pointers had no important variance. At that time, mathematical statistics were made for the collected information. It is determined that the knowledge of experimental group 1 was suggestively superior to that of the control group 2, and the variance was substantial. Temporarily, the questionnaire was directed to assess and examine the data attained and realize the important training feedback: 96% of learners among 100 students are concerned with this type of physical teaching method based on computerized VR tools, thus improving learning interest and inspiration. Figure 8 shows the feedback ratio using the suggested MLCPTM method.

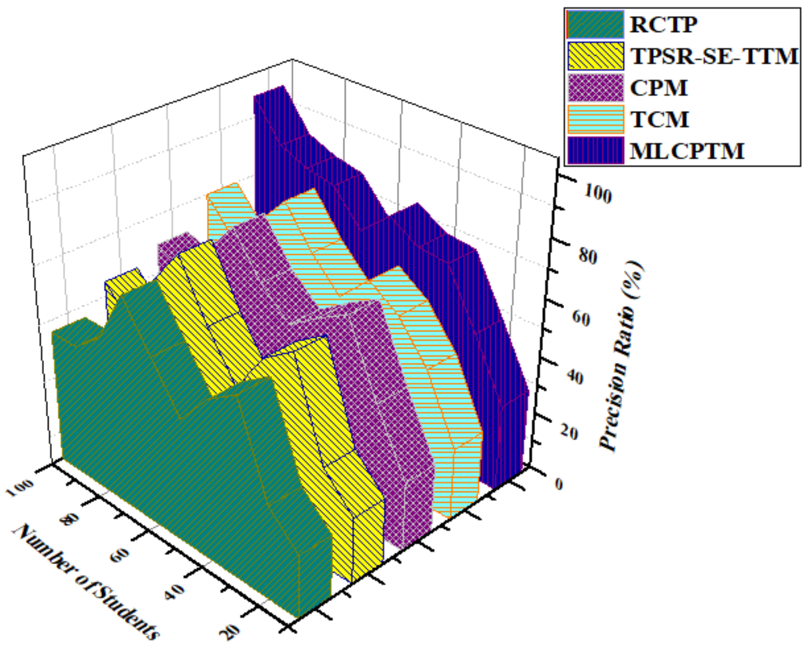

Figure 9: Precision Ratio

Due to the wide variety of physical education courses in schools, school physical education teachers may not be proficient in various sports. The demonstration actions may not be accurate and precise. For physical instructors, virtual reality and machine learning models are a brand new teaching experience. In the conventional teaching

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progression, the instructors can only perceive the learners from one viewpoint and cannot closely watch the learners' fast movements; thus, they fail to deliver detailed instruction. With virtual reality and machine learning technology's help, those issues can all be resolved, and instructors in diverse areas can share images, videos, texts, and multimedia information. They can better exchange their ideas by making use of the dynamic and interactive three-dimensional visualized object. Figure 9 illustrates the precision ratio of the suggested MLCTPM model. The figure shows the highest precision ratio of 97.8%, as the maximum with several students reaches 100.

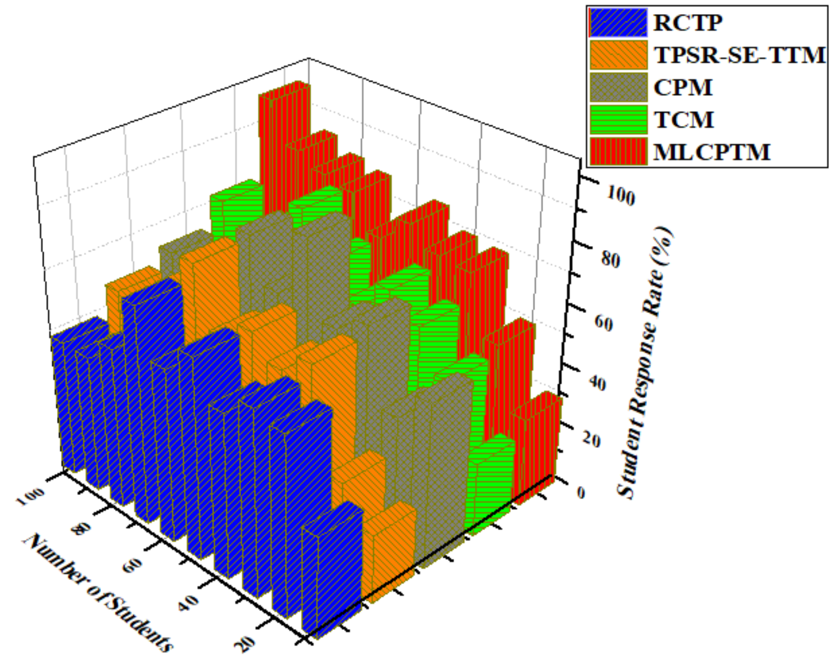

Figure 10: Student Response Ratio

The present study observed Sports Education intervention programs' impact on learners' motivational responses in a high school physical education environment. Figure 10 shows the Student Response Ratio. It fosters physical education tasks that increase learner perceptions of optimal challenges, personal control, and self-competence to expand inherent motivation and progress several positive adaptive learner motivational responses. The physical education curriculum has been intended to be utilized in sport-based actions and has recently demonstrated the potential to improve learners' positive motivational reactions to the physical education model. Figure 10 illustrates the student response rate using the suggested MLCPTM model. The proposed model gives a response rate of 98.6% when the student's count increases to 100.

Doi: https://doi.org/10.54216/FPA.130115
Received: April 22, 2023 Revised: June 13, 2023 Accepted: September 11, 2023

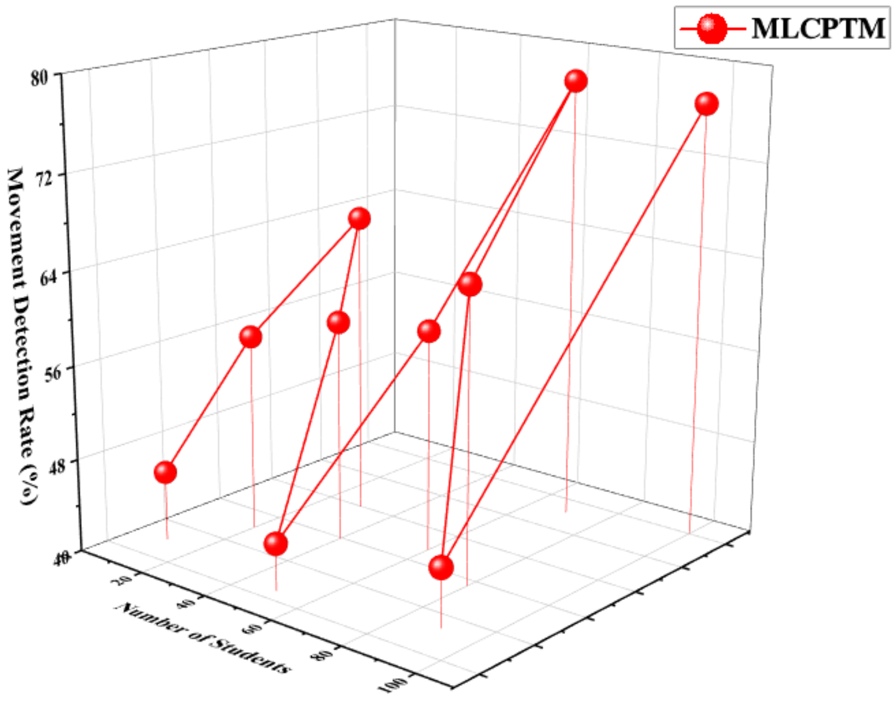

Figure 11: Movement Detection Rate

On the basis of movement patterns and assessed activity trials, energy expenditure has been classified. Movements that require some exertion and are particularly complex can be made shorter by breaking them up into separate workouts or by lowering the demands placed on them in terms of speed or accuracy. Functional sports ability is related to essential stability and mobility, which are the foundation of other physical fitness. These fundamental movement patterns will be imitated in normal individuals' growth, improvement, and basic action patterns. Mobility is demonstrated in a single muscle's stretchability and comprises manifold links of different body parts, like the thigh, pelvis, and trunk interaction during functional activities. The experimental employment here was school-based motion education programs, and children in the experimental group presented higher arithmetic scores and reading skills than the control. Figure 11 demonstrates the movement detection ratio based on the proposed MLCTPM model. For the 100-student pool, the movement detection ratio was observed as 79.84 %.

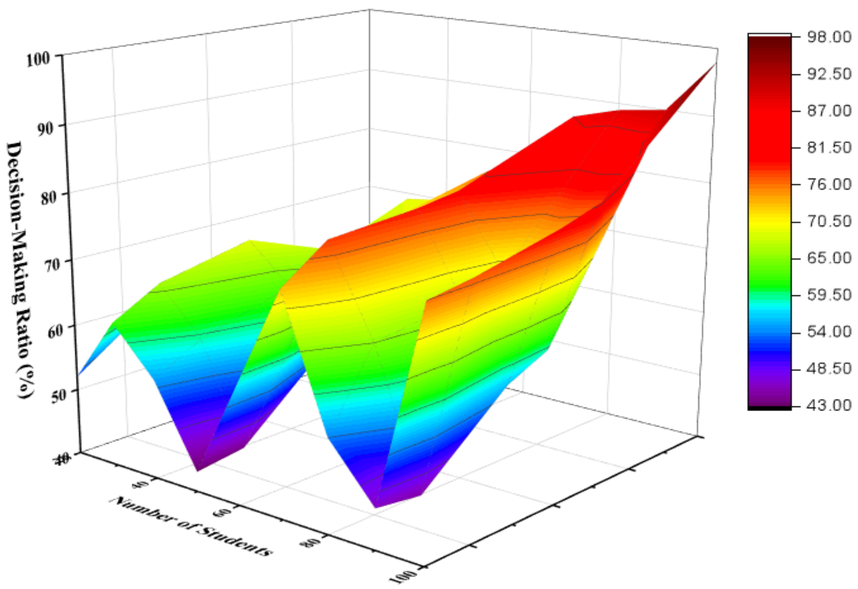

Figure 12: Decision-making Ratio

Doi: https://doi.org/10.54216/FPA.130115
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Individually created VR scenarios that provide secure learning environments might increase the user's incentive to participate in decision-making. Performance-limiting elements in many sports, including racquet and martial arts, are anticipation and decision-making. The VR system may use a decision algorithm based on literature and subject-matter expertise to look for poses, angles, velocities, etc., in the users' movement and compare them to ideal values. The decision-making ratio utilizing the proposed MLCPTM model is shown in Figure 12. Compared to the current model, the decision-making ratio for the 100 students was the highest at 96.3 per cent.

The proposed MLCPTM model enhances the effective learning, feedback, precision student response, movement ratio, and decision-making ratio compared to other existing randomized controlled trial protocols (RCTP), Teaching Personal and Responsibility with Sport Education and traditional teaching model (TPSR-SE-TTM), conditional process model (CPM), trans-contextual model (TCM).

5. End Notes

Virtual reality-based teaching in physical education can enhance the student's learning results, involving repetitive practice and understanding of the fundamentals, regulating posture and grasping the knack, teamwork, mutual support, and promoting learning and motivation. Virtual reality-based teaching in physical education has a positive influence on student learning. The proposed MLCPTM-based teaching method can impress students deeply, enhancing their learning and motivation achievements. It further led to physical education inventions in terms of skills, cognition, and perception and efficiently enhanced learners' learning results. Thus, it was concluded that VR technology with machine learning could be a valuable tool to improve knowledge of physical activity environments under certain conditions and with specific learners. The experimental outcomes demonstrated that the recommended MLCPTM model improved the effective learning ratio of 82.5%, the feedback ratio of 96%, the response ratio of 98.6%, the decision-making ratio of 96.3%, and the movement detection ratio of 79.84%, the precision ratio of 97.8% compared to other existing models.

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