

ORIGINAL RESEARCH ARTICLE

Exploring the implementation of mobile virtual reality technology in higher education physical fitness programs

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ABSTRACT

“College physical education (PE)” has drawn more attention in recent years. “Traditional PE” and teaching approaches cannot keep up with the needs of today pupils, and it is impossible to get them interested in sports. Innovative PE teaching techniques are urgently needed given the contemporary environment, where the nation aggressively pushes information science education. To promote college PE, virtual reality (VR) technology is crucial. Using VR, this work proposes a virtual sports curriculum for physical education. Sensors and other equipment were used to gather experimental data. The study examined changes to student education and athletic engagement, and also the “number of athletic security problems” encountered before and after the implementation of VR technology. It also analyzed instructional data from PE teachers at five universities. The effects of the influence of VR on physical protection, PE teachers, and learners are examined using this experimental data. The final study reveals that the usage of VR within “PE” assisted the “five institutions” in reducing “the total number of accidental injuries in athletics” by almost 75%. VR having a stronger impact on PE teachers’ views on instruction than on how they manage their classes. Following the implementation of VR, there has been a 20% increase in the “number of students” contributing individually in physical education and athletes, as well as a rise in student engagement in both. Finally, the percentages of the five schools’ PE programs using VR were evaluated. The quality of PE at universities will also be indirectly impacted by the use of VR.

Keywords: physical education (PE); virtual reality (VR) technology; sports safety incidents; student learning; student participation

1. Basic principles

“Virtual reality technology” can enhance the fundamental elements of “physical education teaching”, allowing for the efficient interchange of sports data and fully satisfying the demands of students’ independent sports knowledge acquisition. It is advantageous to raise students’ motor skill levels; engaging methods can also spark students’ enthusiasm for learning and boost the effectiveness of their instruction. It is extremely valuable for achieving personal physical exercise because it satisfies the learners’ desire for “physical training”, the sophisticated definition of “physical exercise”, and the suitability of “physical training”^[1]. Additionally, a typical virtual reality experience involves a 3D animation that may be triggered

ARTICLE INFO

Received: 3 January 2024
Accepted: 9 April 2024
Available online: 22 May 2024

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by moving the remote control or the handle of a mobile computer to change the digital data's context, such as the atmosphere. Many disciplines, including physical education, public health, geography education, and health education, have made use of VR technologies. The research of VR in PE is still thought to be in its infancy despite its tremendous rise^[2]. **Figure 1** represents an interaction of many technologies with virtual reality.

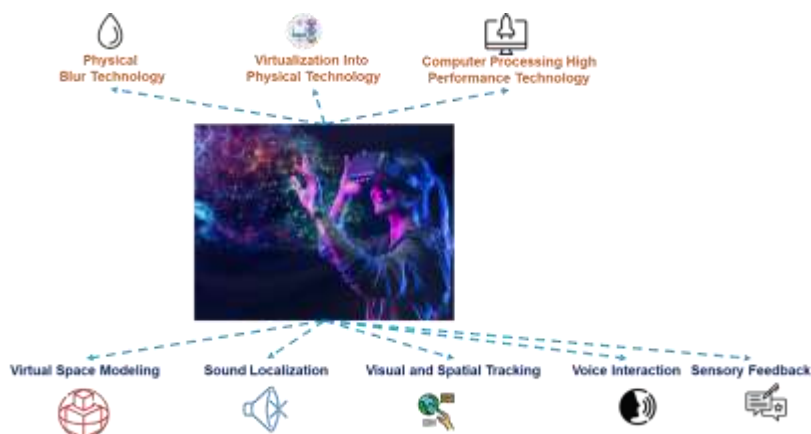


Figure 1. Diagrammatic representation of the interaction of many technologies with virtual reality.

Higher vocational education must emphasize the nurturing of skilled talents with practical application capabilities to comply with the reform of higher education institutions. This concentration on the integration of study and work is also required. The “philosophy” of mental and physical education in colleges is one of openness and practicality, with the slogan “theory is sufficient and practice is the main focus.” College physical education is therefore far from being a pointless “secondary class” in the process of fundamentally increasing the quality of “colleges and universities”. Utilizing the aspects of “college physical education” that emphasize practice is essential; as a starting point, the curriculum and delivery systems for this discipline should be changed^[3]. It is feasible to efficiently integrate different activities to raise the overall level of training and trainer proficiency while ensuring the smooth functioning of the “physical education and training system”. Due to the current conventional “physical education teaching methodology”, which calls for the trainer to practice together while the coach supervises their activities when the instructor tries to teach by himself after the course, he is unable to know whether the particular training activity is typical or not and whether there is no competent advice, which outcomes in the poor effect of after “college training”^[4].

By combining several processes, it is possible to significantly raise the total level of training and trainer proficiency while ensuring the smooth functioning of the “physical education” and “training system”. Due to the present traditional approach to teaching “physical education”, which requires the trainer and coach to

practice together and the supervisor to give guidance on their activities, when the educator instructs by themselves after the course, they are unable to determine whether their learning activity is standard or not and there are no professional guidelines, which has a poor impact on after training^[5]. The main contribution of this paper is to promote college physical education, we propose a virtual sports curriculum.

The further part of the portion shows that section 2 indicates related works, section 3 indicates the proposed methodology and outcome method and section 4 indicates a conclusion part.

2. Related works

The study of Kang et al.^[6] investigates the improvement and reform of “college physical education” instructional activities against the backdrop of fifth-generation mobile communication technology. To study the change in physical education in universities, the “data channel algorithm” and the “Internet of Things (IoT) resource allocation algorithm” are used. Depending on the “Un-narrow Band Internet of Things” downlink system, the application scenario of the “IoT”, “MIMO precoding technology”, and “repeated lifting coverage” of “transmission time interval (TTI)” Data transfer is examined (U-NB-IoT). Additionally, the “deep reinforcement learning” system is used to resolve the resource allocation issue caused by the access of several “IoT” devices. The research of Li et al.^[7] describes the physical education teaching module’s conception and implementation is examined. System functions and a database server are constructed to make the system login possible using the Internet application system as a tool to select network instructions. Additionally, the system can implement the online management of student information and instructional data for physical education, enabling students to study at different levels. Thus, when compared to other systems, this design is more focused and can produce superior educational results. The study of Wang^[8] develops a sophisticated “big data system” regarding “college athletic training” courses. The research primarily concentrates on information “decentralization”, a deficit in cognitive abilities, a lack of technology assistance, and Insufficient use of “venues” in “physical education”. In building a huge data framework, the convenience of data collecting is addressed, and a responsive architecture that works well when collecting analytic facts is selected. The creation and administration of this system have some bearing on the enhancement and “optimization of the current college physical education curriculum”. The research of Jin and Zou^[9] describes the intelligent educational atmosphere, depending on contemporary “information technology”, “innovation”, and “reconstruction of college sports education mechanisms”, to realize the purpose of “college sports education”. This essay examines the historical context and key ideas behind the use of contemporary computer technology in “college physical education” and proposes implementation solutions. Wang^[10] suggested a novel method for teaching assessment in university-level college physical education. The strategy we suggested can enhance the “general traditional BP network” in terms of “global convergence and training time” by merging “neural network” with “genetic algorithm (GA)”. For empirical research, the model makes use of the MATLAB program. MATLAB simulations and experiments showed that the neural network and GA method combination offers promising application possibilities for the assessment of “college physical education” in institutions.

Fan^[11] discuss how computer-based instruction has impacted physical education. This report concludes by outlining the precise application link between them. Reforming physical education is a challenging process. People consider a variety of reform options. Most techniques are extremely expensive. This criterion was breached with the introduction of computer-based education methods. It is challenging for students to participate in some “professional sports training”. Experts have created a “virtual reality approach”. To adapt their eyesight to the virtual environment, students can wear smart glasses. Zhao^[12] investigate the use of “flipped classroom” instruction in “college physical education”. This study recommends A “data fusing technique” centered on a “multi-media system” to improve the “educating modes”. Additionally, it improves the comparable “node clustering approach”, which makes it better suited for the instructional observation of

“flipped classrooms in college physical education”. The study of Xie and Xu^[13] develops a teaching strategy depending on the hypothesis of “multiple intelligences” by utilizing fuzzy mathematics and fuzzy set algorithms. Additionally, we investigate new approaches to teaching college basketball as our research topic, and they use the “multiple intelligences” to assess how well our “student’s sports technology”, teaching prowess, and critical thinking skills stack up. The results of the experiments demonstrate that the teaching strategy, which was depending on the “model of various abilities” was customized to the intellectual capacities of the pupils in the “experimental set” and that communication between “teachers and students” during class time significantly enhanced the students’ capacity. The study of Feng and Liu^[14] outlines a design for an intelligent physical education process while taking into account the dynamic aspects of “physical education” and the constraints of the current “physical education system” and “computer intelligent system”. The application demonstrates how flexible the intelligent physical education teaching system’s architecture is a time and place are no constraints on the instruction, and how it can meet the demands of students in a variety of situations. A study of Guo and Cheng^[15] describes a personalized recommendation technique for “college physical education” teaching resources based on a “cognitive diagnosis model” is recommended to increase the safety of resource recommendations for “college physical education” classes, lower the rate of test overlap, and reduce the rate of resource exposure. The article of Wang and Zhang^[16] explains the auxiliary teaching role of “computer network technology” from the perspective of information fusion, then combines it with the particular application, analyses the user needs in detail, and proposes the improvement plan and implementation method of “physical education network system”. This technology eliminates the time and physical space restrictions of the conventional “physical education” teaching method and enables online learning, student question and answer functionality, material download functionality, and other features. The system is easy to use, has a friendly user interface, and is useful for both teachers and students. It can be used to manage to teach resource information and facilitate teacher collaboration by allowing teachers to share resources. The article of Zhou^[17] enhances the method for assessing education and teaching, for developing a template for “college physical education” based on a “multi-level grey assessment method” that enhances the model’s content and increases the norm of “college physical training.” The level of exercise offered by educators has an important effect on the health of pupils because it is directly related to their well-being. The implementation of new standards for curriculum has an impact on conventional teaching techniques and conceptions, which are no longer able to matching the evolving requirements of modern learning and education. The study of Cao^[18] explores the design of the PE teaching paradigm in high school. “Data mining (DM)” evaluation is used to form valuable data about the “students’ physical characteristics” depending on the “ID3 algorithm” of decision trees coupled with the results of students’ physical test scores. This evaluation gives teachers access to reference data so they can instruct children based on their “aptitude”, achieving the goal of raising the standard of “PE”. The research of Jv and Wang^[19] covers the creation of an online model for “college physical education”, which helps the progress of digitalizing “physical education” and ensures that the majority of college students understand their lessons. There is no denying that this innovative teaching strategy has limitations of its own. The analysis and discussion of these challenges will assist in providing solutions for the comprehensive design and building of the education of “college physical education” in the age of “big data”. The study of Xiao and Liu^[20] analyses have demonstrated that using big data technology and implementing innovation and reform to the “traditional physical education in colleges and universities”, the reform of “PE teaching” in “colleges and universities” is of significant “theoretical significance” and “practical value”. Improvement measures are proposed against the backdrop of “big data” technology in improving the traditional college PE teaching mode, with an eye toward our country’s innovation. The study of Reyes^[21] evaluated how college students at the “Cavite State University—Cavite City Campus” participated in and behaved during physical education classes. The “specific objectives” of the study had to identify the characteristics of “college students” in specifications of “age”, “sex”, “gender”, “course”, and “student participation” in terms of “recitation” and

“practical performance”, as well as to assess the degree of optimism in one’s behavior of “physical health”, “mental health”, “social health”, “emotional health”, “motivation in specifications of intrinsic”, “extrinsic”, and “demotivation”, and “self-confidence” in addition to “individual”, “academic”, and “family problems”.

Problem statement:

Virtual reality scenes require a lot of rendering, which restricts the running environment to expensive integrated machines with high configurations and makes it challenging for regular PCs to function. The internal network of colleges and institutions will be utilized for the test procedure, with the network environment and application servers’ effects on performance measures being the only considerations. To overcome this issue, we propose a virtual sports curriculum to provide better performance.

3. Proposed methodology

Students’ interest in sports is increased by virtual physical education through VR. Using the “virtual reality technology (VR)” in “physical education” classes can enable students to complete some physical activities on their own and may upload relevant sporting educational videos to “clever gadgets” to enable supported training for learners. consequently, lessening the workload placed on PE teachers. **Figure 2** denotes the process of the proposed methodology.



Figure 2. Schematic representation of the proposed methodology (Source: Author).

i) Data attainment

Five schools provided experimental information, which we used to determine student interest in “virtual reality”, variation in the application of VR in the classroom, and student opinions of the use of virtual reality. Finally, an examination of the employment of VR in those same five colleges and universities was conducted, along with a count of the sports education techniques employed there.

ii) Preprocessing using normalization

Some techniques, involving “min-max normalization”, “z-score normalization”, “decimal scaling”, standardizing duration, etc., can be applied to “normalize” datasets. “Min-max and z-score normalization” are the two frequently utilized and popular “normalization” techniques. For our work, the min max approach was applied. For using min-max normalization, the subsequent Equation (1) is employed to normalize features with a range of $[0, 1]$ ^[22].

$$u' = \frac{u - \min_B}{\max_B - \min_B} \quad (1)$$

The lowest and highest values of characteristic B are displayed here as \min_B and \max_B , respectively. The benchmarks indicate the characteristics’ actual and standardized levels u and u' . The aforementioned equation demonstrates how the highest and lowest attributes are changed to one and zero.

iii) Implementation of “virtual reality technology”

In the computer business, the phrase “virtual reality technology” (VR) has replaced “advanced man-machine interaction technology.” Its goals include creating opportunities for network interaction, immersion, and creativity. As of right now, it has been successful in providing consumers with a completely “immersive high-end experience”. It practices a collection of cutting-edge technology, including “computer networks”, “artificial intelligence”, multisensory, and visuals. “Virtual instruction” in athletics is thought to symbolize

significant advances in “educational technology”. The “black lives matter (BLM) member” classifier set is represented as the closest neighbor confidence algorithm for sports players using virtual reality technology. **Figure 3** represents a “virtual reality system” and software architecture for “college physical education”.

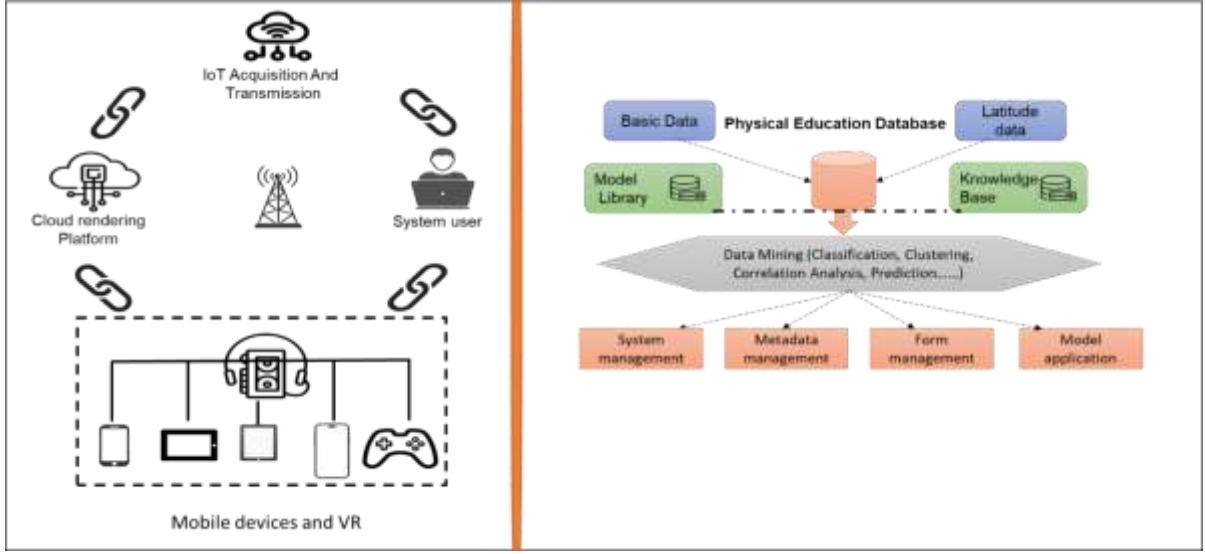


Figure 3. The virtual reality system and software architecture for college physical education (Source: Author).

The “closest neighbor confidence formula” utilizing sports athletes’ “virtual reality technology” is assessed, and the MA_B “member classifier set” is represented as the Equation (2)^[23]:

$$G_B = [MA_1, MA_2, \dots, MA_{B-1} | MA_B \in G] \quad (2)$$

In the formula, G_B indicates a classifier other than MA_B . If it becomes important to categorize non-athletes, the following fundamental presumptions must be true: First, data is gathered from various universities; if students in physical education are from the same university, they are probably similar because of the category. They are unable to replicate the research’s findings but based on the two aforementioned hypotheses, we may roughly estimate the athletes’ degree of confidence. The Equation (3) below can be used to describe the measurement of cosine similarity, assuming there are two “physical education students”:

$$T(N_B, N_X) = \frac{N_B N_X}{\|N_B\| \|N_X\|} \quad (3)$$

The G_B classification can notice a portion of “unlabeled athletes” applied the “training session” included the MA_B “member classifier”. Currently, the consistency may be expressed using the following formula for a specific confidence level of n_j^q and the adjoining areas are noted as k , $Conf(n_j^q)$, as follows:

$$Conf(n_j^q) = \sum_{u=1}^{B-1} \sum_{\substack{i \\ u \neq b}}^y T(n_j^q, n_i^a) \times Consistency(MA_u(n_j^q), k_{n_i^a}). \quad (4)$$

$$Consistency(n_j^q) = \sum_{u=1}^{B-1} \sum_{\substack{i \\ u \neq b}}^y T(n_j^q, n_i^a) = \begin{cases} -1, MA_B(n_j^q) = k_{n_i^a} \\ 1, MA_B(n_j^q) = k_{n_i^a} \end{cases}, (k_{n_i^a}) \in \varphi_j^a. \quad (5)$$

The member classifier set will determine how it votes, G_B to get n_j^q mark:

$$\hat{k}_q = \arg \max_{1 \leq d \leq D} G_B(n_q) \quad (6)$$

iv) Data analysis and experimental findings

College safety schools have placed a lot of emphasis on physical education (PE), which has raised concerns from parents. Security incidents have a detrimental effect on school instruction and sports teaching.

But as VR has gained popularity, the risk to college sports safety has considerably lowered and there are fewer instances. In five universities (“A”, “B”, “C”, “D”, and “E”), the application of VR and the rate of “sports safety incidents” were investigated, along with the influence of VR on computer security. Reasonable influence contrasts and evaluates PE’s current state. The data for sports accidents are shown in **Table 1**. This table outlines incidents involving sports safety at various colleges and universities before and after implementing safety measures. It indicates a significant decrease in incidents after implementation, with usage percentages ranging from 10% to 33%. The dwindling numbers reflect a substantial reduction, ranging from 64.1% to 82%, suggesting the effectiveness of safety measures in mitigating risks in sports activities.

Table 1. Table with data on incidents involving sports safety.

Colleges and universities	After use	Usage (%)	Before use	Dwindle numbers (%)
A	11	24	52	77.2
B	12	20	50	73.5
C	14	10	42	64.1
D	10	33	65	82
E	13	28	65	78.4

The information in the table reveals that college physical education has advanced significantly since VR was implemented. Among these, the use of VR relates to the university’s G technology popularization efforts and C the fraction of the number of classes. Equation (7)^[24] is stated as

$$\text{Usage} = \frac{H}{D} \times 100\% \quad (7)$$

The ratio of the “number of sports safety accidents” that have occurred with VR use to those that have occurred without the use of the technology is referred to as “reduced number and numbers. The Equation (8) is stated as

$$\text{Dwindle numbers} = \frac{\text{After use} - \text{Before use}}{\text{Before use}} \times 100 \quad (8)$$

To examine evaluation the modifications within the “the amount of athletic security incidents in five colleges” and universities in an improved visually pleasant manner, we replaced **Table 1** with a graphic that displays the shifting of each group of facts. **Figure 4** shows the final result.

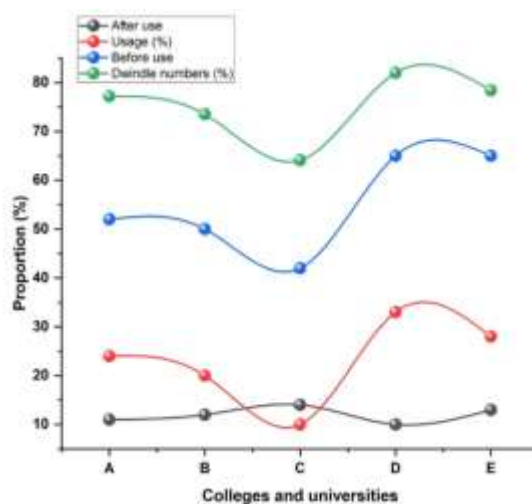


Figure 4. A comparison of incidences involving sports safety in colleges and universities.

The collection of collegiate “sports safety incidents” has greatly reduced since the usage of VR, as shown by the information and graph change patterns in **Figure 4**, and the decrease is directly related to the

use of VR. The prevalence of VR in “College D” has increased to 35%, and this university has experienced a reduction in sports safety issues when compared to the data-to-use ratio, which has reached 85%. The popularity of VR at school C is only 11%, which means that fewer sports safety accidents have occurred here than in the college as a whole (which only uses 65.1% of the data). As a result, it can be seen that VR significantly improves the safety of college PE.

Since there are 233, 251, 224, 236, and 242 teachers overall in the five schools, we choose the “teaching philosophy”, “teaching attitude”, “teaching content”, “teaching skills”, “teaching management”, and “teaching evaluation” as the effect elements of VR. In each impact item, we tally the proportion of educators. **Table 2** displays the “total number of people enumerated”, and **Table 3** displays the proportion table.

Table 2. Quantity of educators in every influenced element.

	Content	Evaluation	Philosophy	Management	Attitude	Method
A	52	52	75	33	64	67
B	56	63	66	41	31	63
C	33	51	70	35	47	50
D	58	62	63	35	58	62
E	51	65	61	31	61	41

Table 3. Table of teacher ratios by influence element.

	Content (%)	Evaluation (%)	Philosophy (%)	Management (%)	Attitude (%)	Method (%)
A	22.1	22.1	31.5	13.5	26.9	28
B	21.6	24.5	26.1	15.6	11.5	24.3
C	14.1	21.5	30.7	15.1	20.3	21.4
D	24.3	25.7	26.4	14.3	24	25.5
E	20.4	26.1	25	11.7	23.6	16.3

Although the number of educators who have altered is not considerable, the numbers in **Tables 2** and **3** demonstrate the modifications which VR make to the way school “PE teachers” educate. **Tables 2** and **3**’s figures demonstrate how VR can alter how school PE teachers deliver their lessons, however, the number of educators who have altered is not appreciably large. However, j corresponds to the number of schools and i corresponds to the location of the influence item. Equation (9) is stated as

$$O = \frac{S_{ji}}{B_j} \times 100\% \quad (9)$$

To evaluate the amount of instructors involved in every effect area across the “five schools”, **Tables 2** and **3** were transformed into graphs. The outcomes of this transmission are depicted in **Figures 5** and **6**.

Figures 5 and **6** demonstrate that education C has 130% of the overall impact elements while VR has a lower influence on PE instructors’ methods of instruction. The most impacted school was school A, where 151.5% of students in each affected category were impacted. There are five schools with the lowest percentage of instructors in educational organization have a total of only 76.3% of teachers. VR has little impact on college PE instructional administration.

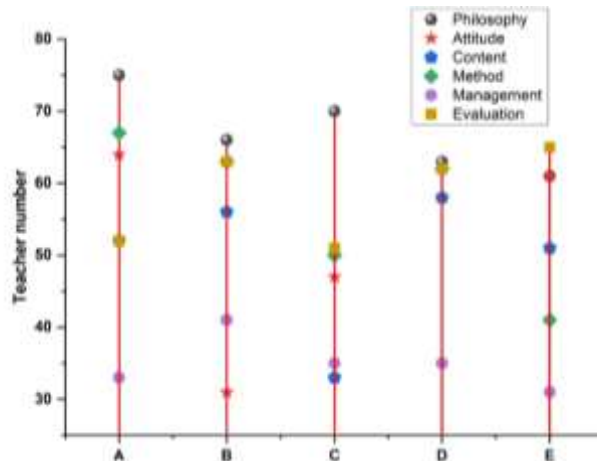


Figure 5. The number of instructors in every category has an influence.

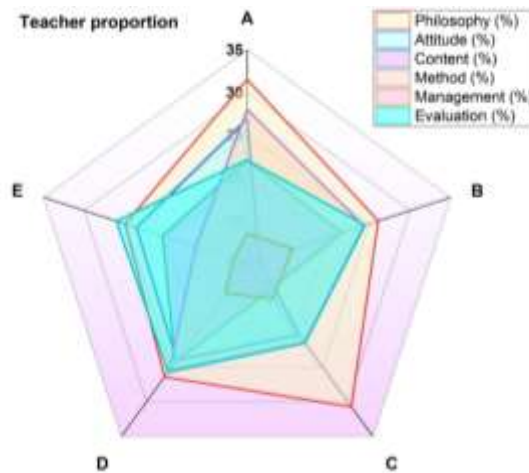


Figure 6. The percentage of instructors in every influenced element.

Students rapidly lose interest in physical education and sports because the old PE teaching paradigm cannot match their needs for “physical education”. With the advent of VR, “physical education” at “colleges and universities” has transformed, allowing students to focus more on sports and fitness. This study contrasted the percentage students who trained frequently before and after the activity’s reorganization, surveyed student ratings of VR, and examined VR’s effects on students. It involved students from five different schools. The assessment of VR by students is done by scoring, with a maximum achieve of 10. The “average student scores” on the VR are then calculated. The statistics and innovation assessment results for the number of pupils participating independently in physical education and sports are given in **Table 4**.

Table 4. Table evaluating innovation and student population figures.

	Before use	Growth rate	After use	Average score
A	1870	0.352	2530	7
B	1644	0.237	2035	7.5
C	1636	0.204	1970	7.3
D	1868	0.411	2634	8.1
E	1892	0.381	2514	8.6

Table 4’s results show that after the five schools implemented VR in PE, there has been an increase in the “number of students” contributing individually in activities and PE, and these kids had higher ratings for VR. After integrating VR into physical education, the number of students engaging in sports and PE individually has grown significantly across all five schools. On average, there’s been a 31.7% increase in

participation. Additionally, the average score for VR experiences has risen from 7 to 8.1, indicating enhanced satisfaction and engagement. This growth reflects the effectiveness of VR in stimulating individual involvement in physical activities, as well as its positive reception among students, highlighting its potential to revolutionize PE curriculum delivery.

To more clearly see how the data evolves, we plot the data in **Table 4** as graphs. In **Figure 7**, the conversion outcomes are displayed.

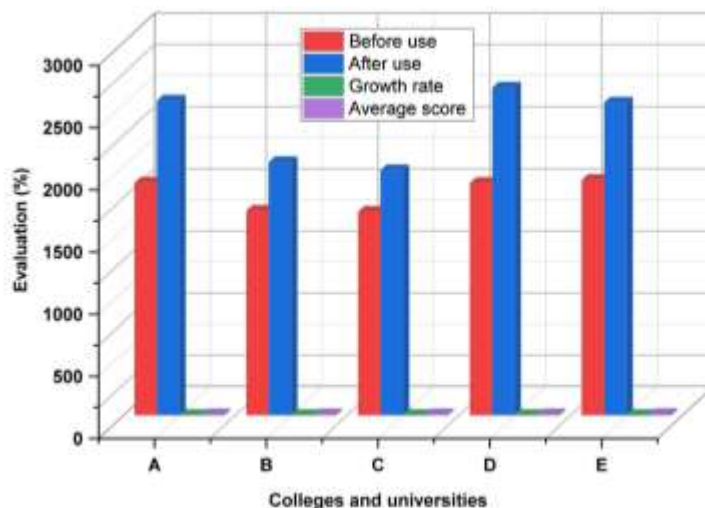


Figure 7. Graph showing changes in student enrollment and evaluation.

Figure 7’s data reveals that five schools have used VR in physical education to influence students in specific ways. Students in “college D” who individually absorb in physical education and sports increased at a faster rate than any other group, increasing by 0.412 points, while learners in “college C” who individually absorb in “sports learning” and athletic have risen at a slower rate, increasing by 0.205 points. All of the student scores for VR are above 7, which suggests that while the students’ experience with VR was not bad, they could have been better.

The involvement of “100 students” in sports education and exercise was also sampled, and it was split separated into four categories: “highly interested” (I), “generally interested” (II), “not interested” (III), and “very uninterested” (IV). “Number of students” at all levels were tallied., and the shift in sports students’ interests between the time VR was used and before it was examined. Last but not least, **Table 5** displays the amount of students in every class.

Table 5. Student interest changes.

	Before use				After use			
	I	II	III	IV	I	II	III	IV
A	11	52	18	14	34	46	9	9
B	9	60	15	10	28	55	13	0
C	6	53	23	23	16	64	14	4
D	14	61	19	3	43	51	2	0
E	12	60	15	9	38	55	1	1

A notable shift in students’ interest in sports education and competition before and after implementation. Across all categories (I, II, III, IV), there’s been an average increase in participation from 10.4 to 26.4. Particularly, Category IV displays the most significant growth, with an average increase from 11.4 to 5.4. This suggests a substantial rise in engagement levels post-implementation. However, in category

III, there's a slight decrease from 18.2 to 11.6 on average, indicating a possible area for further improvement or adjustment in the curriculum to maintain or enhance interest levels.

The statistics in **Figure 8** show that before VR was implemented in PE in five schools, there were roughly 30 students who did not show any interest in sports or learning about them. Following the implementation of VR in PE classes, there are only about 20 pupils who are not interested in sports or sports learning. Only 15 pupils, at most, are interested in learning about and participating in sports. Following the implementation of VR, there is a sharp rise in the number of pupils with this level of interest, with the 45 schools with the highest enrollment. Thus, integrating VR into physical education can increase students' enthusiasm for sports-related learning and competition.

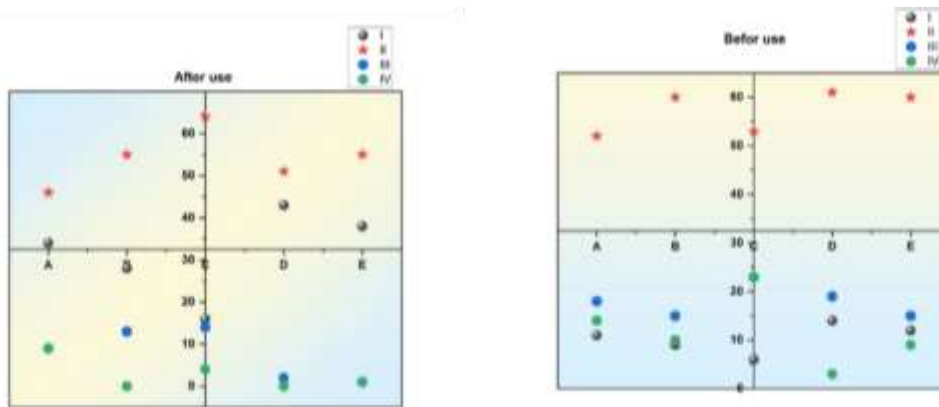


Figure 8. Change in students' interest.

The use of VR in the physical education classes at the five schools is examined in this study, together with data across the use of “application programs (APP)”, “artificial intelligence (AI)”, “traditional teaching (TT)”, and “media courseware (MC)” in PE and instruction. **Table 6** displays the Final statistics findings.

Table 6. The proportion of all technology utilized in sports and classrooms.

Teaching method	A (%)	B (%)	C (%)	D (%)	E (%)
VR	24	20	10	34	28
AI	2	4	2	4	4
MC	10	9	4	6	8
TT	44	43	68	36	35
APP	16	18	11	18	18

The information in **Table 6** demonstrates how VR, “artificial intelligence”, “media courseware”, conventional guiding methods, and utilization packages are used in the instruction of PE college students. This proportion of data consumption in five schools that utilize accounting denotes the application of various teaching modalities; utilization volume denotes the “number of classes” applying a specific “teaching model” and with the use of the Equation (10), the “total class number” displays the “total number of classes” at the institution as

$$\text{Usage} = \frac{\text{Usage amount}}{\text{Total class number}} \times 100\% \quad (10)$$

We graphed the information in **Table 6** to more clearly see how these instructional methods are being used, and the outcome is considered in **Figure 9**.

Depending on the “usage ratio” table in **Figure 9**, We determine the use with numerous “PE” and instruction training methods in “five schools”. “rings” within a “ring chart” depict the schools “A”, “B”, “C”, “D”, and “E”, respectively, stretching from interior to exterior. Five schools use VR to varying degrees in

their physical education classes: 25%, 21%, 11%, 35%, and 30%, respectively. As can be seen, there is still space for improvement in the way that five schools are using VR to teach physical education. **Table 7** depicts an evaluation of athletic training effectiveness in virtual reality technology.

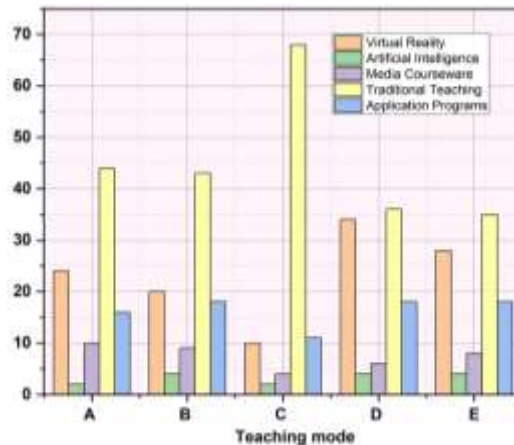


Figure 9. Ratio of VR Compared with different teaching techniques in college physical education.

Table 7. Evaluation of virtual reality technology on athletic training effectiveness.

	Number of volunteers	
	Training effect	Self-confidence
Very advantageous	15	18
Favourable	8	2
Uncertain influences	2	5
Unfavourable	3	1
Very disadvantageous	1	3

Figure 10 illustrates how the trainees described it as being very negative to them. The majority of students who saw a benefit said they could play freely and without worrying about other people’s eyes in a virtual world. They won’t be made fun of even if they make a mistake. On the other hand, students who believe virtual reality is bad for their sporting confidence reported that they thought periodically turning on the “VR eyepieces” seemed bizarre and that is much more frightened about the “eyepieces” slipping during exercise and leading to other students going to make fun of them.

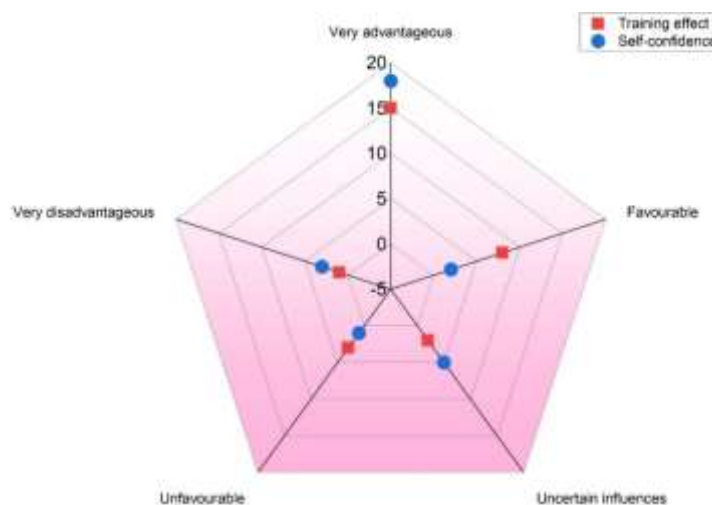


Figure 10. Effect of “virtual reality technology” on athletic training effectiveness and “self-confidence”.

4. Conclusion

The university's teaching strategy is continually being improved upon and modified to allow students to achieve significant advancements in morals, "intelligence", "mathematics", and "aesthetics". The application of VR in the guiding of a variety of academic disciplines has made significant progress at a "Internet of Things environment". advancement of technology, which employs VR to research college sports and uses VR in university athletics is essential to the "development of the Internet of things". The study collected and evaluated PE teachers' instructional information from five different institutions, according to the "number of sports security occurrences" occurring before and after the arrival of VR, and examined conversion in "student learning and sports enthusiasm". We compared the numbers of students participating in sports at these five universities "before and after" the implementation of VR. The use of VR and some other instructional techniques in these five universities were finally evaluated. The study enhanced pupils' enthusiasm for taking part in school and sporting activities. The execution lacks thorough thought and understanding, and the technical and theoretical knowledge of virtual reality technology is insufficient. No analysis upon "physical education" that recommends the use of "virtual reality technology" is more thorough, serious, or comprehensive.

Author contributions

Conceptualization, PS and VDJ; methodology, PS; software, DRD; validation, PS, VDJ and DRD; formal analysis, ME; investigation, AV; resources, PS; data curation, HP; writing—original draft preparation, VDJ; writing—review and editing, PS; visualization, HP; supervision, PS; project administration, VKS; funding acquisition, VKS. All authors have read and agreed to the published version of the manuscript.

Acknowledgments

I would like to express my sincere gratitude to "Rathinam Technical Campus, Coimbatore, Tamilnadu, India" for their invaluable support and resources that significantly contributed to the success of this research. The academic environment and facilities provided by the institution played a crucial role in the completion of this study. I am thankful for the encouragement and guidance received from the faculty members, whose expertise and insights enriched the quality of my research. Rathinam Technical Campus has been an essential part of my academic journey, and I am deeply appreciative of their continued commitment to fostering research and education.

Conflict of interest

The authors declare no conflict of interest.

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